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GENITO-URINARY INFECTION IN CHILDHOOD*

BY

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The subject of to-day's discussion, under slightly modified titles, has been reviewed at two previous meetings of this Section. In 1910 in London the discussion was opened by Dr. Box; the infection was assumed to be an ascending one because of the sex preponderance in females. Treatment by alkalis was recommended for acute cases, but for chronic cases there was little to be offered. The second occasion was at Winnipeg in 1930, Dr. Wilkinson opening the discussion. Two important advances were recorded: first, the work of Chown (1927) and Wilson and Schloss (1929), showing that the infection was usually blood-borne, was reviewed; secondly, the value of specialized urological investigation in chronic cases was emphasized.

Terminology

The term "pyelitis," implying acute infection of the renal pelves, would seem to be a misnomer, for if the old view of an ascending infection is correct there must be a preceding cystitis, and "pyelocystitis" would then be a better term. It is my opinion that a relatively small number of cases, and these in girls, arise in this way. On the other hand, if the evidence of Chown and others is accepted, the infection in boys, and in the majority of girls, reaches the urinary tract through the kidney from the blood stream, and for these the term "pyelonephritis" is to be preferred.

Pyuria

Since the ultimate diagnosis of urinary infection rests upon the finding of pus in the urine, some comment may be made on this. It is often stated that a few pus cells may be found in the urine of healthy girls, and it is therefore important to have some guide as to what number of pus cells should be regarded as of pathological significance. A few years ago my house-physician, Dr. Cumings (1931), investigated this point and found that in eighty-eight healthy boys only three had pus cells in their urine, the greatest number being 4 cells per c.mm., while in eighty healthy girls fifty-five had pus cells, numbering up to 64 cells per c.mm. Dr. Alice Dickie also studied this aspect in her recent M.D. thesis, and I am grateful to her for allowing me to quote her figures. She investigated the urine of 900 children free from urinary infection and found that, using a high-power lens, the urine from boys usually contained no pus, and never more than 1 cell per field; while, for the girls, more than 2 cells per field was abnormal. In both investigations the urine was passed naturally into a clean vessel after the glans or vulva had been swabbed, a drop being taken from a specimen that had been shaken up.

The fundamental importance of examining the urine microscopically for pus cells when any child is suspected of urinary infection cannot be too emphatically expressed. Merely to boil the urine for albumin is useless, because it is so likely to be present in other conditions, and, alternatively, if the amount of pus is slight albumin may not be detected. In the more severe instances of pyelonephritis a few red cells may be found in the urine, but their number is seldom sufficient to colour the specimen. It may be added that if the urine is to be cultured it is essential in girls to obtain the specimen by catheter, while in boys it may be collected aseptically after swabbing the glans with an antiseptic. Although culture of the urine is not essential for the diagnosis of urinary infection, which rests upon the finding of pus in the urine, a knowledge of the infecting organism will affect the choice of treatment, and therefore as soon as the presence of pyuria has been determined a specimen for culture should be obtained.

Aetiology

The two aspects to which I shall refer are the age and sex. With regard to the former, although pyelonephritis occurs throughout childhood it is most common in infancy; indeed, Craig (1935) was able to report sixty-one instances arising in the neonatal period. Graham's (1933) figures, based on 435 cases, demonstrate very clearly the distribution according to age (Table I).

TABLE I.—*Age Incidence of Pyelonephritis in Childhood (435 Cases)*

Age period ..	0–6 months	7–12 months	1–3 years	3–12 years
Number of cases	128	102	82	123

It will be seen that more than half the cases occur during the first year.

As to sex incidence, it is admitted that infection of the urinary tract is more common in girls, and this has been the accepted teaching for many years. Two results have followed: it has been used as a strong argument in favour of regarding the infection as an ascending one; and by stressing the incidence in females the possibility

* Read in opening a discussion in the Section of Diseases of Children at the Annual Meeting of the British Medical Association, Aberdeen, 1939.

that a urinary infection may underlie an unexplained pyrexia in a male child has been apt to be overlooked. Table II shows the sex incidence as reported by various observers.

TABLE II.—*Sex Incidence of Pyelonephritis in Childhood*

Author	Age Group	No. of Cases	Percentage of Females
Craig..	Neonatal	61	34
Graham	Under 6 months ..	128	55
Gorter (1926) ..	Under 1 year ..	61	56
Author*	Under 2 years ..	50	60
Graham	Under 3 years ..	312	70
Gorter	Throughout childhood	114	73
Morse (1909) ..	,, ,,	50	60
Graham	,, ,,	435	75
Thomson (1910) ..	,, ,,	25	84
Dickie	,, ,,	43	81

* A series of cases analysed in the infants ward at St. Giles Hospital (L.C.C.).

The table shows what is now generally acknowledged —namely, that the preponderance of female cases applies to the period after infancy, but that during the first year or two boys are affected almost as often as girls, while in the newborn there is actually a majority of cases in boys. Now the high incidence of urinary infection in infancy has been ascribed to the ease of ascending infection through the contact of soiled napkins against the vulva, but this argument would only be valid if the sex preponderance in females was particularly noticeable in infancy. The figures given above show that at a time when ascending infection may be expected to occur most readily the sex incidence is practically equal. To my mind the figures afford a strong argument against the theory of an ascending infection.

The high incidence in infancy is probably connected with the fact that this is the age when gastro-enteritis is most common, and there is frequently a history of some bowel upset immediately preceding the onset of pyelonephritis. It may well be that this disturbance is sufficient to lower the resistance of the bowel to the passage of bacteria, enabling them to gain the blood stream. In this connexion the occasional occurrence of rigors at the onset is probably of significance, for in childhood they usually connote a septicaemic state.

Symptoms

Neonatal Infection.—At this age the symptoms may differ a little from those in older children; for instance, the onset may be somewhat vague, and restlessness, vomiting, diarrhoea, diminished urinary output, or collapse may occur initially. Almost always the temperature is raised, and when this happens within three or four days of birth there is a tendency to call it "dehydration fever," assuming it to be due to the low fluid intake of the first few days. Dehydration fever settles quickly when extra fluid is given, but this does not exclude a urinary infection as a possible underlying cause, for the diuresis produced by the extra fluid might well be sufficient to alleviate a urinary infection. The diagnosis of dehydration fever should not be accepted until the urine has been shown to be free of pus. It may be added that at this age a high fever does not necessarily indicate a bad outlook; indeed, the most severe instances may have throughout a subnormal temperature.

Collapse.—This is also particularly likely to be encountered in young infants. In the attack the face appears grey and drawn, the lips are livid, and the forehead and scalp become pale. Such attacks may recur, and always indicate a severe infection, dangerous to life. They may come on gradually, and as gradually pass off, or may develop suddenly, the pulse and respiration becoming rapid, shallow, and irregular. At this age convulsions also are to be regarded as a bad sign.

Vomiting.—This is another important symptom of urinary infection in infancy. It may become persistent, and as it is often associated with loose, undigested, or offensive motions, it is easy to miss its significance and to rely for treatment on manipulations of the diet. When dietetic difficulties arise in an infant owing to repeated vomiting, the stools are unhealthy, and the weight remains stationary a urinary infection should always be suspected.

PYELONEPHRITIS AS A SECONDARY CONDITION

In infants the frequency with which pyelonephritis occurs as a secondary condition is not always appreciated. Of fifty patients under 2 years of age admitted to St. Giles Hospital in 1936–8 only sixteen could be classed as having uncomplicated or primary urinary infection. In the remainder the illness for which admission to hospital was sought was as follows:

Respiratory infection (bronchitis, pneumonia)	20 cases
Otitis media	2 ,,
Gastro-enteritis	6 ,,
Skin infections	5 ,,
Meningococcal meningitis	1 case

The proportion of cases secondary to gastro-enteritis is unusually small, but this is due to the fact that in an attempt to control ward infections the admission of infants with gastro-enteritis was stopped in 1938.

Dickie's similar investigation on forty-three children with *B. coli* pyelonephritis showed that the infection was primary in twenty and secondary in twenty-three. In her series gastro-enteritis accounted for one-third of the primary disorders. It is right to point out that in both these series the infants were drawn from definitely poor homes, and that, although urinary infection may occur in any social grade, its occurrence as a secondary disease is more likely to be encountered in children from poor and overcrowded homes, where the standard of resistance to infection is low.

The part that vitamin deficiency plays in promoting urinary infection is difficult to assess, but that it is probably of importance is indicated by the rarity of pyelonephritis in breast-fed infants. In my series there were twenty-one infants under 9 months old, and none of these was breast-fed. It is well known that both rickets and scurvy may be complicated by urinary infection, especially scurvy, and in the few fatal cases of infantile scurvy that I have met with pus cells have usually been present in the urine before death.

Treatment of Acute Infections

The treatment of pyelonephritis may be divided into the management of acute, and chronic or recurrent, cases. For many years the treatment of choice for acute pyelonephritis has been to give alkalis in doses sufficient to render the urine alkaline, and the question that now arises is whether this treatment should give place to mandelic acid or sulphanilamide therapy. The first point is whether alkalis alone can bring about a cure; I submit that the long experience with alkaline treatment leaves little doubt

that complete cure is usually obtained. This aspect was particularly investigated by Neale (1931), who analysed 130 cases, and found that when cure came about it was complete, and that in later years there was no evidence of permanent or progressive damage to the kidneys. The second point is whether the alkaline treatment is of itself at all harmful to the patient, and here again alkalis show up well. They can be given in large doses to children of any age, and their only limitation is that in infancy they may sometimes cause a slight diarrhoea. Even this is lessened if bicarbonates and citrates are used in a mixture instead of relying on citrates alone. We have, then, in alkalis a harmless efficient remedy for the majority of children with acute pyelonephritis. Mandelic acid has the disadvantage that it is an acid preparation, which often has to be combined with extra acidifying agents, and for a child who is acutely ill with a high temperature treatment by alkalis is, on general principles, to be preferred to treatment with acids. Sulphanilamide overcomes this difficulty in that it may be combined advantageously with alkalis; but its toxic symptoms, although admittedly uncommon, are greater than those of alkalis alone. Perhaps the most important point of all is to know whether there is in the background some congenital abnormality of the urinary tract. Now, although treatment with alkalis alone will clear up the majority of cases of acute pyelonephritis, it may relieve, but certainly will not cure, a case with urinary tract deformity. If it is found that a thorough trial of alkaline treatment over a period of three weeks or so is not leading to a cure, special urological investigations, mentioned later, should be undertaken to determine the presence and nature of any congenital deformity. On the other hand, treatment of acute cases with mandelic acid or sulphanilamide is likely to sterilize the urine even in the presence of a congenital deformity, and this may lull the physician into a false sense of security by masking the essentially chronic nature of the condition, and so deterring him from instituting a full urological investigation. The position may be summed up by saying that if acute cases are to be treated with mandelic acid or sulphanilamide, then after the urine has been sterilized the patient should be submitted to a full urological investigation in case some congenital deformity is being overlooked; but, by treating these cases in the first place with alkalis, special investigations need only be carried out in the small group that proves resistant to treatment. These may then be treated with either mandelic acid or sulphanilamide. The relative merits of these two preparations are considered later.

Alkaline Therapy

The most useful alkalinifying agent is potassium citrate, which must be given in an amount sufficient to render the urine strongly alkaline. In practice it is easy enough to bring the urine down to neutral, but it is often difficult to get it beyond this point. Another practical point is that it is useless to give alkalis by day and allow the urine to revert to acid during the night, and therefore treatment must go on through the twenty-four hours. No exact directions for dosage can be given, because this must be determined by testing each specimen of urine with litmus as soon as it is passed; such doses as 10 grains every three hours day and night for an infant, and four times this dose for a child of 6 or 7, are often required. The alkaline reaction of the urine should be maintained for at least ten days after the symptoms have subsided and the urine has become free of pus. It sometimes happens that although the temperature falls the urine becomes more and more offensive, and it is then useless to continue with alkalis; a change to mandelic acid or sulphanilamide would be indicated.

The mode of action of alkalis is not fully understood. Hare, Lepper, and Martland (1928) have shown that the urine cannot be made alkaline enough to become bactericidal, and it would seem that the beneficial effect is to a large extent the result of diuresis. In this connexion it is of interest that "dehydration fever" of the newborn, which is sometimes associated with pyuria, quickly responds as soon as sufficient fluid is given to promote diuresis.

Treatment of Chronic Infections

The development of urological technique suitable to young children has demonstrated the fact that when an acute infection, in spite of treatment, becomes either chronic or recurrent, this is generally associated with some stasis of urine: occasionally this may be caused by a stone, but is much more likely to be due to some congenital abnormality in the architecture of the urinary tract. The old diagnosis of "chronic pyelitis" has rightly been given up, for, faced with a child with a chronic urinary infection, the physician should co-operate with the urologist in an attempt to discover if there is an underlying cause.

The following methods of investigation are at our disposal. First, the type of infecting organism must be ascertained, for this may influence the choice of drug treatment. Secondly, an intravenous pyelogram should be carried out in order to ascertain not only the anatomical outline of the renal pelves and ureters but also to gauge whether the secretion of the kidneys is in any way delayed. Uroselectan B or perabrodil is generally employed, the amount injected being not less than 5 c.cm., otherwise a clear picture is not likely to be obtained. At 2 years of age the dose should be 8 c.cm., at 5 years 10 c.cm., increasing to 15 c.cm. at 12 years. By this means a pyelogram can be obtained even in young infants, the youngest in my experience being a baby of 9 weeks. Such abnormalities as horseshoe kidney, hydronephrosis, double ureter, kinks or stenoses of the ureter may be revealed. The next step is a cystoscopy, and ascending pyelography. In a female infant it is possible to perform a cystoscopy and pyelography from birth; in the male, a cystoscopy is sometimes practicable from birth, but ureteric catheterization cannot be undertaken before the age of 2 or 3 years. Lastly comes the investigation of renal function by such methods as the blood urea, urea-concentration test, and urea-clearance test. Unfortunately it not infrequently happens that abnormalities are bilateral, and both kidneys are damaged, so that surgical relief may be impracticable; on the other hand, if the deformity is unilateral, surgical intervention may be hopefully undertaken with the prospect of the child returning to normal health.

The next point concerns the sterilization of the urine. Treatment by alkalis is generally quite useless, and although extensive trials have been made of such treatments as hexamine and similar urinary antiseptics, vaccines, and sera, these methods are mostly without effect. Recently, however, there have been two important advances in treatment. In the first place we have the salts of mandelic acid; and, secondly, the sulphanilamide group of drugs. Both have the great advantage for children that they are effective when given orally.

Mandelic Acid

The two preparations now generally used are ammonium mandelate and calcium mandelate. Both salts have the

advantage of making the urine strongly acid, although even so it is generally necessary, in my experience, to give some additional acidifying agent. Calcium mandelate is insoluble in water, but has the advantage of being tasteless. Ammonium mandelate in the form of the elixir is not unpalatable, and a mixture similar to the elixir in use at Great Ormond Street is as follows:

Ammonium mandelate, 26 grains*
Liquid extract of liquorice, 5 minims
Elixir of gluside, 1/5 minim
Water to 1 drachm

* Equivalent to 1½ grammes of mandelic acid.

The dose required varies according to the age: at 1 year at least 3 grammes of mandelic acid should be given in twenty-four hours, equivalent to two teaspoonfuls of the above mixture, while double this amount will be needed for a child of 10 years.

It is essential to keep the urine sufficiently acid, and it is necessary to test a specimen each day. For this purpose a few drops of methyl-red should be added to a third of a test tube of urine; if the urine is acid enough it develops a pink colour, otherwise it becomes orange-coloured. Should the mandelate by itself not produce the necessary acidity, an agent such as ammonium phosphate must be given. A suitable mixture is:

Ammonium phosphate, 7½ grains
Liquid extract of liquorice, 5 minims
Syrup of lemon, 15 minims
Water to 1 drachm

The amount required will be indicated by the methyl-red reaction; from two to six teaspoonfuls a day may be necessary. The administration of mandelic acid should be maintained for a week after the urine has become sterile, otherwise a relapse may easily occur.

Although mandelic acid therapy has proved to be a most valuable weapon it has its limitations. The undesirability of giving strongly acid preparations in acute cases has already been mentioned. In chronic cases there is often considerable impairment of renal function, and it may then be almost impossible to get a sufficient concentration of the drug in the urine to render it sterile. The type of infecting organism is also important; for while infection by *B. coli* or *Streptococcus faecalis*, or a mixture of these, responds favourably, those organisms that are associated with an alkaline urine, such as staphylococci, and organisms which split urea down to ammonia, such as *B. proteus*, are not destroyed by this treatment.

With regard to results, Braasch (1937) reported mandelic acid to be bactericidal in 80 per cent. of cases of uncomplicated urinary infection. Summerfeldt and Brown (1938), reporting on fifty-two children, twenty-one of whom had chronic infection, found that 12 per cent. did not respond, while 20 per cent. suffered a recurrence of symptoms within twelve months. Droller (1938) compared thirty-one cases treated with mandelic acid with twenty cases treated with sulphanilamide; in the first group 71 per cent. were cured and in the second group 75 per cent. Such figures give a fair picture of what may be expected with this line of treatment.

SULPHANILAMIDE

The sulphanilamide group of drugs—prontosil, proseptasine, uleron, sulphapyridine—since their first introduction to clinical medicine a little more than two years ago, have already established a world-wide reputation, and have been shown to possess such a wide sphere of usefulness that it is not surprising to record their definite value in urinary infections. One effect of this has been to limit quite sharply the use of mandelic acid. This is shown in the following chart, which records the amount of

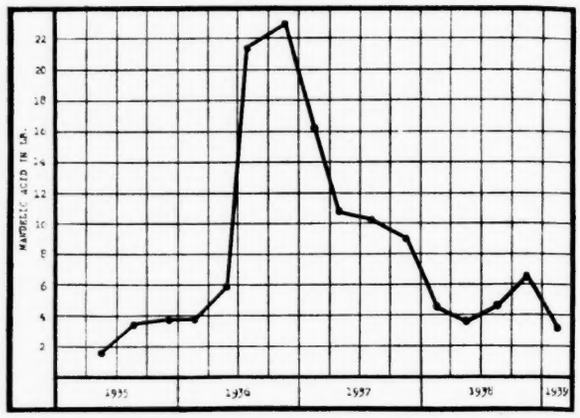

Chart showing amount of mandelic acid dispensed during each quarter of the year at the Hospital for Sick Children, Great Ormond Street.

mandelic acid in pounds dispensed at Great Ormond Street in each quarter of the year since 1935.

Sulphanilamide is most effective in a slightly alkaline urine, and it is advantageous to prescribe twenty or thirty grains of alkali a day. This dose is of course not comparable to the larger doses given in the alkaline treatment of acute urinary infections. The concentration of sulphanilamide required for sterilization of the urine—50 mg. per 100 c.cm. of urine—can usually be obtained without difficulty even in the face of impaired renal function, which gives the drug a definite advantage over mandelic acid. Once again the bacteriology of the urine is important, for the sulphanilamides usually give a prompt success in *B. coli* infections, and will often clear up that most resistant organism *B. proteus*, but their action against the *Streptococcus faecalis* is disappointing: mandelic acid is here the weapon of choice.

The dose of sulphanilamide varies with the age, but it is more effective to give a relatively big dose over a short period than prolonged administration of a small dose. To an infant of 6 months 0.25 gramme (half a tablet) six-hourly, and four-hourly at 1 year, is generally tolerated without difficulty, while in the second half of childhood 0.5 gramme may be given every four hours. The usual precautions against giving sulphur-containing drugs or foods such as aperient salts and eggs must be observed in order to lessen the chance of cyanosis. Toxic effects from these drugs are, however, uncommon; the one that in my experience has caused most difficulty has been vomiting, although that has not been at all common; should it occur, it will continue until the drug has been completely withheld. A morbilliform type of eruption occasionally arises, and I have seen it in one case. The rash disappears when the drug is withdrawn. The most serious complication is agranulocytosis; but fortunately it is rare, and I am glad to say that I have not met with an instance. Bigler and others (1938) have shown that there is often a slight drop in the leucocyte count, but this is not sufficient to influence the response of the patient.

I have purposely not drawn any distinction between the various preparations that may be used, for with regard to urinary infection their differences are scarcely apparent. The dose is the same whichever preparation is used. As

with mandelic acid, sulphanilamides should be continued for a week after the urine has become sterile, otherwise relapses may occur.

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ANAESTHESIA IN DENTAL SURGERY*

BY

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The majority of dental operations in this country are performed in the dental surgery under nitrous oxide anaesthesia on ambulant unpremedicated patients. In most cases this agent affords a pleasant and rapid induction, quick recovery, and freedom from after-effects. Ninety per cent. are managed satisfactorily, but the remainder present difficulties, mainly on account of the weak anaesthetic properties of nitrous oxide. Discussion of the conduct of anaesthesia for major dental operations and the special problems of anaesthesia for dental work in children will not be undertaken in this brief review, which deals with the problems arising in the 10 per cent. of patients who prove difficult under nitrous oxide anaesthesia in the dental surgery. Later, cyanosis, anaemia, and respiratory obstruction are discussed, since it is felt that a fuller appreciation of the underlying physiology and pathology of these conditions will make for smoother and safer anaesthesia.

The patient may present difficulties on account of his psychological approach to anaesthesia or because of resistant physical qualities which are difficult to overcome with a weak anaesthetic such as nitrous oxide.

Psychological Considerations

The problem here is to prevent disturbances during induction. The energy for resistance is dissipated early during anaesthesia, so that maintenance is no more difficult than in the average patient. The prospect of being rendered unconscious is not a pleasant one: addiction to anaesthesia is unknown! In the great majority of adult patients this natural apprehension is not sufficient to disturb the even course of anaesthesia. Two classes need special attention—one the undisciplined with poor self-control; the other the basically nervous but superficially controlled patient, who typifies the "stiff upper lip" school and who may not betray any mental disturbance until well after induction is begun. This first type is uncooperative from the beginning, but the patient whose training has enabled him to mask his fear by rigid self-control presents a different problem. The early part of induction is smooth, but as soon as conscious control is lost his basic fear is manifested by struggling.

For both these types premedication is valuable. It varies from reassurance, the patient's own particular fear being dealt with, to the use of sedative drugs. These should not depress the patient to such an extent that he is unable to leave the surgery within a reasonable time. Simple but effective premedication is 10 grains of aspirin the night previously, and this dose repeated two hours before the operation. If the patient dislikes induction by inhalation it can be avoided by giving a small intravenous dose of barbiturate—for example, 0.2 gramme of evipan or pentothal—and continuing anaesthesia by nasal administration of nitrous oxide. Small doses of pentothal are rapidly eliminated, so that recovery is scarcely if at all longer than after nitrous oxide alone.

Physical Considerations

Certain types of patients are notoriously difficult to anaesthetize, and their resistant qualities are most evident when a weak anaesthetic such as nitrous oxide is used. Although the anaesthetic-resistant patient is usually robust and often hard-living, occasionally a small wiry man displays a resistance which his appearance belies. Resistance to anaesthetics is markedly increased by alcoholism or any other drug addiction.

Nitrous oxide is the weakest of all anaesthetics. If it is to be used successfully for the anaesthetic-resistant patient its weak action has to be reinforced by reducing the oxygen intake to levels where asphyxial signs appear. There is only a narrow margin of anaesthesia between response to a surgical stimulus and asphyxial spasm. An attempt to subdue a difficult patient with nitrous oxide alone results in anoxial muscular spasm which may make operating difficult. If the anaesthetist is unwise enough to persist, spasm of the adductor muscles of the larynx may follow, with resultant respiratory obstruction. Artificial respiration or inflation of the lungs is then impossible because of the tightly closed glottis. The situation is alarming. Since muscular rigidity passes off before death, artificial respiration must be continued so that the lungs will be immediately expanded on relaxation of the spasm. This state of affairs can be avoided by combining the nitrous oxide with a more potent anaesthetic which will allow the introduction of enough oxygen to avoid production of anoxial spasm. The most useful drugs for this purpose are the barbiturates, given intravenously, or ethyl chloride. Anaesthesia should be induced by the former in cases where it is considered improbable that nitrous oxide will be adequate. The extra time involved in the preparation of a sterile intravenous injection is amply justified by the results. If the operation has been started with nitrous oxide and the patient unexpectedly proves to be unmanageable it is technically impossible to give an intravenous injection, and the supplemental use of ethyl chloride is of value because of its potency, ease of administration, and rapidity of action.

If it is decided to reinforce nitrous oxide by the use of a barbiturate, a small dose (for example, 0.2 to 0.4 gramme) of evipan or pentothal injected rapidly will produce unconsciousness. A large proportion of the drug is carried to the brain by the vast carotid circulation, causing immediate unconsciousness. Anaesthesia is continued at once by nitrous oxide administered nasally. Provided a clear airway is maintained the barbiturate can

* Read in opening a discussion in the Section of Pharmacology at the Annual Meeting of the British Medical Association, Aberdeen, 1939.

be disregarded, since its effect, given in these doses to this type of patient, is transient. In the course of a very short time its distribution from the brain to tissues with a less abundant blood supply results in a lightening of anaesthesia. If the barbiturates are slowly injected a larger dose is required to produce the same depth of anaesthesia, and recovery is correspondingly delayed. Rapid injection is recommended only when small doses of the drug are used. The small amount of barbiturate given will afford a pleasant induction and will increase the margin of anaesthesia. The recovery period is scarcely longer than after nitrous oxide used alone, being in marked contrast to the slow recovery after large doses.

When ethyl chloride is necessary to deepen the effect of nitrous oxide it should be sprayed on to the bib turned up over the mouth. If the patient is mouth-breathing, anaesthesia deepens rapidly and, even if nose-breathing, enough of the vapour reaches the pharynx to augment the action of the nitrous oxide. Application of ethyl chloride must stop at the onset of automatic respiration, and anaesthesia is continued with nitrous oxide and enough oxygen to avoid cyanosis, the import of which is considered later. If during the operation the patient shows signs of returning consciousness, anaesthesia should be deepened again by giving ethyl chloride as before. Preparatory to this care is taken to see that the mouth is free from debris and a fresh sponge left in position. Small supplemental doses of ethyl chloride seldom cause post-operative nausea in this type of patient, but vomiting and prostration may occur if deep or prolonged anaesthesia has been attained mainly by the use of ethyl chloride.

Cyanosis

Before dealing with the anaemic patient the significance of cyanosis must be considered. At the outset it can be stated that when it occurs during nitrous oxide anaesthesia its presence is not necessarily a sign of danger or its absence an assurance of safety. With other anaesthetics cyanosis is a sign of respiratory obstruction or arrest. With nitrous oxide, as a result of essential reduction in the oxygen intake, its occurrence in the average case is inevitable.

The discussion of cyanosis is facilitated by classifying patients according to the haemoglobin content of the blood, which in an average case is taken as 15 grammes per 100 c.cm. This amount will be greater for the plethoric patient, but in severe anaemia it may be as low as 5 grammes per 100 c.cm. Cyanosis can occur only if the absolute amount of reduced haemoglobin is 5 grammes or more per 100 c.cm. of blood. Inhalation of a mixture containing less oxygen than in the air results in diminished alveolar oxygen tension and hence incomplete oxygenation of the circulating blood. A definite proportion of the haemoglobin is oxygenated irrespective of the total amount present. This is shown in the well-known association-curve of haemoglobin.

To illustrate the application of these facts, the effect of inhalation of nitrous oxide mixed with enough oxygen (about 10 per cent.) to oxygenate two-thirds of the circulating haemoglobin may be considered. In the plethoric patient with, say, 18 grammes of haemoglobin per 100 c.cm. of blood, 12 grammes will be oxygenated, 6 grammes remaining in the reduced form. In a normal patient having 15 grammes of haemoglobin per 100 c.cm. of blood, 10 grammes will be oxygenated, 5 grammes remaining reduced; while in an anaemic patient with only 6 grammes of haemoglobin per 100 c.cm. of blood, 4 grammes will be oxygenated, leaving 2 grammes reduced. There is thus definite cyanosis in the plethoric individual, mild cyanosis in the normal patient, and no change in the colour of the anaemic patient.

Because nitrous oxide is carried in solution in the blood plasma the concentration of this agent is the same in the three types discussed. Of these the anaemic patient, despite the fact that he is not cyanosed, will be the most depressed, since the oxygenation of his blood is lowest. In contrast to this the plethoric man, although cyanosed, will hardly be unconscious, since he has still a large amount of oxyhaemoglobin circulating. From this the unreliability and danger of using cyanosis as a sign of depth of anaesthesia with nitrous oxide is obvious. The occurrence of cyanosis in advanced anaemia is impossible, and the anaesthetist will find that during deepening of nitrous oxide anaesthesia in such a patient there is no colour change. Respirations become more and more shallow, and the patient will in fact "fade away" and die without any suggestion of cyanosis. On the other hand, with a plethoric patient, if the anaesthetist regards cyanosis as a sign of anaesthesia he may allow the operator to begin before the patient has even lost consciousness.

The Anaemic Patient

The anaemic patient is particularly susceptible to the action of any anaesthetic, or oxygen-lack. It is often erroneously stated that nitrous oxide is unsuitable for such a patient. On the contrary, a weak anaesthetic is obviously indicated for the type of patient easily depressed by narcotics. It is essential to appreciate that cyanosis, muscular rigidity, or jactitation, which are frequently seen at some stages of nitrous oxide anaesthesia in an average or robust patient, are completely absent if the degree of anaemia is severe. The anaemic patient is easy to anaesthetize, and danger lies only in interpreting the absence of cyanosis and muscular signs as proof that anaesthesia is not deep. Properly handled, nitrous oxide can be the safest anaesthetic for this type, but if handled carelessly it can be as rapidly lethal as any other, causing death from asphyxia, without the physical signs usually associated with this condition.

Anaesthesia in Laryngeal Obstruction

Oedema of the larynx may follow extension of any neighbouring inflammatory process. In dentistry this may be encountered in a patient with an inflamed impacted wisdom tooth. Clinically it is revealed by signs of partial respiratory obstruction. When conscious the patient increases his normal inspiratory effort by use of the accessory muscles of respiration. He is thus able to expand his lungs despite the obstruction produced by the narrowed laryngeal opening. These accessory muscles are under conscious control, and their action ceases with the loss of consciousness. Without the extra power afforded by this voluntary act the automatic respiratory muscles alone are not sufficient to draw the air through the narrowed glottis, respiratory efforts become ineffective, and, unless immediate tracheotomy is performed, the patient will die of asphyxia.

If the patient is dyspnoeic and is using his accessory muscles of respiration, death will follow the production of deep unconsciousness by any means. Such fatalities are only too frequent and, since the underlying pathology is not appreciated, they are generally attributed in error to the particular anaesthetic used. If the accessory respiratory muscles are in action, unconsciousness should not be produced unless tracheotomy is first performed under local anaesthesia. This preliminary tracheotomy removes the respiratory obstruction and with it any contraindication to the use of general anaesthesia.

Obstruction of the Airway during the Operation

In an unconscious patient the possibility of obstruction of the airway by the tongue must be borne in mind. With an unconscious patient in the dental chair, the tongue is not as likely to fall back and occlude the laryngeal opening as when he is recumbent, but it may be pushed back inadvertently by the dentist. It is the anaesthetist's duty to keep the airway clear, but he may, in practice, wittingly allow obstruction of this type to persist unrelieved in a fit patient for five to ten seconds if it assists the operator in a difficult extraction. The anaesthetist should, however, appreciate that the anaesthetic is being complicated by respiratory obstruction and consequent anoxaemia, and if this time is exceeded he must insist on co-operation from the dentist in re-establishing a clear airway. The condition is most likely to occur during extractions in the lower jaw. With his non-extracting hand the dentist is inclined to obtain purchase by depressing and pushing back the lower jaw, and with it the tongue. To prevent this type of obstruction the anaesthetist should exert counter-pressure by pushing the lower jaw firmly forwards from the angle. The dentist should also assist by pulling the lower jaw forwards and upwards with his non-extracting hand instead of pushing it backwards and downwards.

From the nature of the work the danger of respiratory obstruction is ever present in dental surgery. An operation in the mouth should not be performed without a sponge attached to a tape in position to safeguard the larynx from obstruction by blood or debris. A sponge should never be left in the mouth unless a tape is attached to it. If it becomes soaked in blood or mucus it can obstruct respiration by slipping into the larynx, and without an attached tape may be very difficult to remove. A soiled sponge must be substituted by a fresh one as often as necessary.

The first essential in anaesthesia for any type of surgery is the maintenance of a clear airway. Neglect of this rule is the most fruitful cause of lack of smoothness in anaesthesia, and of danger. Complete protection of the air passages during dental work can only be afforded by endotracheal anaesthesia, which assures a clear airway and enables packing-off of the pharynx to be perfect. For practical purposes, however, this is advisable only for major dental operations, which should not be undertaken in the dental surgery, but in a hospital or nursing home.

Summary

The problems of nitrous oxide anaesthesia for the ambulant unpremedicated dental patient are discussed, and the psychological and physical factors which affect the course of anaesthesia are dealt with.

Methods of extending the scope of nitrous oxide in resistant cases by the supplementary use of intravenous barbiturate or of ethyl chloride are described.

The effects of nitrous oxide in anaemic and plethoric patients are reviewed, and the significance of cyanosis is discussed.

The special problem of anaesthesia for a patient with respiratory obstruction due to oedema of the larynx receives attention, and the danger of general anaesthesia for such a case without preliminary tracheotomy is stressed.

Prevention of the common causes of respiratory obstruction during operation is reviewed.

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THE CEREBROSPINAL FLUID IN ANTERIOR POLIOMYELITIS

BY

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AND

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During the outbreak of anterior poliomyelitis in Swansea and the neighbourhood in 1938 we had occasion to examine fifty-five cerebrospinal fluids taken from fifty-three suspected cases. These were all subjected to enumeration of cells, differential count, and full chemical analysis, and the following points emerge from a general survey of the examinations correlated with the clinical aspects. The cases examined come under the following groups:

A. Poliomyelitis with definite paresis before lumbar puncture	16
B. Limb weakness and loss of reflexes at the time of lumbar puncture, subsequently diagnosed as poliomyelitis	15
C. Cases later found to have poliomyelitis ...	2
D. Fatal cases proved histologically to have poliomyelitis (post-mortem samples of fluid)	2
E. Illness of doubtful origin	3
F. Cases ultimately diagnosed as having other diseases	11
G. Recovered after a short period as suspects, no illness materialized	4

In summary, there were thirty-five cases definitely shown to have poliomyelitis, three probably mild cases, four false alarms or abortive cases, all suffering from other diseases.

Analysis of Cerebrospinal Fluid

Analysis of the fluids in Group A showed the following characteristics: an increase of cells with an average of 51 lymphocytes and 6 polymorphs per c.mm., and a range of 4 to 250 and 0 to 31 per c.mm. respectively; an increase in the protein value of range 10 to 100 mg. per 100 c.cm., with an average of 41 mg. per 100 c.cm.; the presence of globulin; and a definite though small Lange curve, with a maximum at Tubes 4 and 5 and seldom rising above the level of 2. There was a fine fibrin clot in five of the cases. The glucose and chlorides in all the fluids were within the normal limits.

In Group B the findings were similar but the total cell count was somewhat higher and the number of polymorphs decreased, the ranges being 3 to 225 and 0 to 9 per c.mm. of lymphocytes and polymorphs, with averages respectively of 78 and 2 per c.mm. The average protein was 48 mg. per 100 c.cm., with a range of 30 to 95 mg. per 100 c.cm., and globulin was present in all the fluids; the Lange curves resembled those of Group A but shifted slightly to the right, the maximal tubes being 5 and 6. Clot occurred in six of the fluids. The glucose and chlorides were within normal limits. It is of interest to note that those fluids with the lower protein value all had a definite increase in cell count.

The cerebrospinal fluids from the two cases in Group C had the same characteristics as those of the first two groups. The two fluids taken post mortem, Group D, had similar changes, but there was a higher degree of

pleocytosis. Of those in Group E, one was taken post mortem and resembled those in the previous group; one was heavily contaminated with blood, and showed a mixed pleocytosis, normal net protein, glucose, and chloride content; while the third was, from the analysis, consistent with anterior poliomyelitis. Of the eleven cases in Group F, all the fluids were normal except those which proved to have some other intracranial lesion such as tuberculous meningitis, head injury, or lateral sinus thrombosis. The four cases in Group G had normal fluids.

From these analyses the importance of a *full* examination of cerebrospinal fluid in cases suspected of poliomyelitis seems to be established. It will be noted that in the cases clinically "doubtful," but ultimately established as poliomyelitis, the cerebrospinal fluids showed either pleocytosis or significant changes in chemical composition, sometimes both, while on the other hand complete normality of the fluid in all respects enabled poliomyelitis to be excluded in the great majority of cases. The finding of a normal chloride and glucose value will exclude any meningitis which, clinically, might be hard to differentiate in the early stages. We were unable from these analyses to obtain any definite information as regards the changes in the fluid at different stages of the disease; the history of onset in a number of cases was not reliable.

In two patients diphtheria infection was present, but in the first of these there was strong clinical evidence also of anterior poliomyelitis affecting both right limbs, and the comparison of the two spinal fluid analyses is interesting. The first had a pleocytosis of 15 lymphocytes per c.mm., protein 50 mg. per 100 c.cm., a trace of globulin, with a Lange curve 001110000000, glucose 61 mg., and chlorides 760 mg. per 100 c.cm. The second case, which showed no evidence clinically of anterior poliomyelitis, had a pleocytosis of 34 lymphocytes per c.mm., protein 25 mg. per 100 c.cm., no globulin or Lange curve, glucose 76 mg., and chlorides 850 mg. per 100 c.cm. One patient with palatal paresis might well have been considered to be post-diphtheritic, but bacteriological and clinical evidence favoured a diagnosis of poliomyelitis, as did the analysis of the cerebrospinal fluid. Three of the cases which were diagnosed as anterior poliomyelitis had facial paralysis. These are of particular interest in that, in the absence of any epidemic and without the analysis of the cerebrospinal fluid, they would probably have been missed. In all three there were definite changes in the fluid of the order stated under Group A.

In our series there was one known contact, a brother and bedfellow of a fatal case. The clinical signs were indefinite, but the cerebrospinal fluid showed characteristic changes.

Conclusions

Detailed analysis of spinal fluid is a valuable adjunct in the detection and diagnosis of poliomyelitis and polioencephalitis.

The finding of a completely normal fluid practically excludes a diagnosis of this disease.

Slight pleocytosis is a constant feature and a few polymorphs are commonly present in the early stages.

Slight protein increase is usual and develops with progress of the disease.

Globulin, if only a trace, is always found. The Lange gold curve often affords useful corroborative evidence.

Our thanks are due to Drs. Thomas Evans, Tighe, Pugh, and Farr Davies, of the Swansea Borough Health Department, for their collaboration, and to Mr. Leonard Snow for the chemical analyses of the fluids.

ACUTE YELLOW ATROPHY OF THE LIVER

TWO CASES, WITH ONE RECOVERY

BY

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The recent recording of a case of liver atrophy by Millar and Park (1939) has stimulated the presentation of the following two cases having certain points of similarity, which I believe to be of considerable significance.

Case I

A previously healthy primigravida, aged 21, was seen as an emergency on account of lack of progress twenty-four hours after labour started. The os was two fingers dilated; there was no obstetrical abnormality save that contractions were feeble, irregular, and ineffective, though very distressing to the patient. A diagnosis of primary uterine inertia was made and a quarter grain of morphine administered; labour pains ceased and the patient slept for a few hours. The following day contractions recurred at intervals, but no progress was made: the patient took very little nourishment, and vomited after drinking milk.

On the third day, after catheterization and a hot enema, labour proceeded slowly, and by evening the head was on the perineum, but the patient was unable to deliver herself and was getting very tired. Delivery was therefore completed by forceps under light chloroform anaesthesia lasting some twenty minutes, a very small amount of chloroform being used. The total duration of labour was sixty-eight hours, during which the patient had taken very little nourishment and a minimum of fluids. Her general condition was fairly good considering the length of labour, though she was very tired.

The first day of the puerperium was uneventful and the patient appeared much better, but a restless night followed, and when seen on the second day she was drowsy, had marked tachycardia, a normal temperature, and had vomited curdled milk on one occasion. The blood pressure was normal and the urine contained no bile, albumin, or sugar. The drowsiness rapidly increased to the verge of coma; the vomiting persisted, the vomit becoming "coffee ground" and later black from altered blood; and a trace of jaundice appeared, but there was no alteration in liver dullness. The severity of the condition was increasing rapidly and the patient was transferred to hospital, where she was treated with intravenous saline and glucose; but coma deepened, and death ensued within a few hours of admission. In hospital lumbar puncture showed the cerebrospinal fluid to be normal, and the urine contained a little albumin and acetone. No other abnormal constituent was noted, though tyrosine and leucine were not tested for. A necropsy was performed, at which the liver was found to be normal in size, but section revealed widespread necrosis. The whole body was deeply jaundiced, the lungs showed general oedema, and a few subpericardial haemorrhages were found in the heart, but there were no other significant findings. The pelvic organs were healthy. The cause of death was said to be necrosis of the liver.

Case II

A normally healthy woman, aged 32, was submitted to induction of labour at the eighth month on account of increasing pre-eclamptic toxaemia, which treatment had failed to control. It was a second pregnancy; the first, eleven years previously, had been terminated a fortnight before full term for the same reason. The patient had enjoyed good health between the two pregnancies, and all investigations had failed to show evidence of loss of kidney function. Grossly septic tonsils had been removed in the interval as a possible source of danger. On the day of induction there was slight generalized oedema, the systolic blood pressure was 155, and the urine, which was only six ounces in amount during the

twenty-four hours, contained 2 grammes of albumin per litre. Under short ether anaesthesia bougies were introduced into the uterus about midday, and following the anaesthetic there was a moderate amount of vomiting, which persisted at intervals through the night. Labour began the following morning and was completed spontaneously after fourteen hours, the baby being alive and well. Chloroform was administered during the second stage of labour, approximately one ounce being used.

Following delivery the patient slept badly and complained of nausea and retching with a very little vomiting. She was given 50 c.cm. of 20 per cent. dextrose intravenously on the first day of the puerperium; this relieved the symptoms, and she was able to take fluids. The urine increased in amount to 32 ounces during the first twenty-four hours after delivery. Early on the morning of the second day the patient became very restless and began to vomit again, at first small amounts of mucus and blood, changing to "coffee ground" and later black vomit. She complained of great weakness and was inclined to be apathetic; there was slight jaundice, which increased rapidly throughout the day. Liver dullness was diminished, the lower border being two fingerbreadths above the costal margin. Temperature was 97.6°, pulse 120 and of poor volume, and the systolic blood pressure 150; the tongue was moist but furred, and reflexes were very brisk. A diagnosis of acute yellow atrophy was made, and later confirmed by consultants. The intravenous dextrose was repeated, followed by two intravenous injections of a pint of 10 per cent. glucose at intervals of six hours. Insulin, 10 units, was given with the first pint, but not thereafter. Calomel, one-quarter grain hourly, to 2 grains, was followed by half an ounce of magnesium sulphate. Fluids were not well tolerated by mouth at first, though the vomiting practically ceased.

Throughout the succeeding night the patient was gravely ill; she was pale, drowsy, and very weak, and the pulse feeble, irregular, and at times uncountable. The bowels moved well, the stool being pale but not clay-coloured. There was some improvement on the following day (third of puerperium), drowsiness decreasing and the pulse strengthening; but it was only temporary, for by the fourth day the drowsiness increased to stupor, the pulse was poor, and jaundice was very pronounced. Urine, however, was passed freely, and continued so throughout; the amount of albumin decreased steadily, though bile pigments were now present in varying amount. There was no further vomiting, fluids being freely taken when the patient was roused from her stupor. Anahaemin 2 c.cm. was injected and fluids were pushed orally, fruit juices, glucose, milk with marmite, and ice being given in quantity. On the fifth day the patient remained comatose throughout; it was impossible to rouse her, though in spite of this she swallowed automatically whenever her mouth was filled from a feeding-cup. Temperature was 99.6°, the pulse varied from 116 to 146, and the blood pressure was lower. Towards evening respiration tended to be stertorous, the pupils were widely dilated, and there was some twitching of the facial muscles. On the sixth day her condition was practically unchanged, but respiration was more normal, the pulse improved in quality, and towards evening it became difficult to get fluids in by mouth, the patient appearing to resent interference.

On the seventh day liver dullness was found to be restored, the pulse improved further, and the patient roused once and spoke for the first time for three days. Improvement continued all day, and she awoke spontaneously in the evening and asked what had happened. Jaundice was still pronounced; the urine contained bile pigments, but albumin was less than 0.1 gramme per litre. The blood pressure was approaching normal, and oedema had almost disappeared. Thereafter improvement was rapid, though there was some mental confusion for a few hours after the patient regained consciousness. Within a fortnight she was able to sit up in a chair for a few minutes and, though convalescence was protracted, recovery was eventually complete and the patient has since remained in good health. The urine and blood pressure are normal, and she is able to lead her ordinary active life. The only legacy of this grave illness appears to be a very infrequent digestive disturbance lasting a few hours, usually following the taking of rich food.

Comment

The two cases of acute liver atrophy here recorded present certain features in common. Both occurred in puerperal women; in both chloroform had been given, the total amount being small; and in each case the onset of symptoms had been preceded by vomiting with restricted food and fluid intake. In Case I the period of restricted intake was three days, but it was at a time when a great deal of energy was being expended. The extent of the diminished intake and its significance was not appreciated until reflection and inquiry afterwards. In the second case diet had been of necessity restricted for some three weeks because of pre-eclamptic toxaemia, and fluid intake had been minimal for twenty-four hours following induction of labour, because of post-anaesthetic vomiting. In each case a patient who was partially exhausted and who is believed to have been partially dehydrated, though not to a degree recognizable clinically, was given a substance highly toxic to liver cells. The dangerous potentialities of chloroform in this respect have been shown by the work of Whipple and Sperry (1909), Opie (1910), and others.

It is suggested that these facts have an important bearing on the aetiology of acute yellow atrophy: that exhaustion and dehydration are predisposing factors to liver damage of peculiar significance. The case of Millar and Park (1939), previously mentioned, lends support to this view. It is further suggested that a patient who is vomiting and dehydrated, from whatever cause, should be regarded as a potential candidate for liver atrophy, and the administration of any protoplasmic poison, or drug known to affect liver cells, be done with extreme caution, preferably preceded by glucose saline intravenously. These cases also emphasize the importance of maintaining the strength and fluid intake of women during prolonged labour.

With regard to treatment these two cases are also instructive. Case I received no treatment until the condition was well advanced and the patient almost moribund. This was due largely to delay in diagnosis and failure to appreciate the indications of treatment. On the other hand, Case II was treated early and vigorously with glucose and abundant fluids, both orally and intravenously. At one period 50 ounces was given by mouth in five hours. Also, quite fortuitously, intravenous dextrose had been given before the liver condition became apparent. Although it is admitted that in Case I, which ended fatally, the liver damage was probably more severe and progressed extremely rapidly, yet, on the other hand, Case II, which recovered, was suffering from a severe degree of pre-eclamptic toxaemia absent in Case I. It is impossible to know whether Case I would also have recovered if treatment had been adopted as it was in Case II. Rightly or wrongly, recovery in Case II is attributed to the use of glucose and abundant fluids, and it is believed that the early and energetic use of glucose and fluids is of prime importance in the treatment of acute yellow atrophy. A search of the literature has shown that the majority of the few reported cases of recovery have been treated with glucose and their recovery attributed to that. Thus Eden and Holland (1937), Grant and Miller (1936), and Duncan and MacLachlan (1933) have reported cases, and Millar and Park's case (1939) was treated with glucose and fluids intravenously.

Other methods used in the treatment are difficult to assess in value. Insulin was given once in this case, but was discontinued partly because of lack of facilities for

obtaining blood-sugar estimations and partly from doubt as to its value. It has been used more extensively in other cases, notably by Grant and Miller, and Millar and Park. Anahaemin and marmite were adjuvants of theoretical value in the treatment, and at least seem unlikely to be of any harm.

Lastly, the recovery is of interest from the prognostic standpoint. It is the custom to regard acute liver atrophy as an invariably fatal condition, and in Case II death certainly seemed imminent and inevitable to those of us who watched; but the patient survived, illustrating that recovery can occur even in what appears the most hopeless of cases.

I am indebted to the Dean of the Faculty of Medicine, Edinburgh University, for permission to publish these two cases, which have already been embodied in a thesis for the degree of M.D. (1938).

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PUERPERAL AGRANULOCYTOSIS FOLLOWING SULPHANILAMIDE TREATMENT

RECORD OF A FATAL CASE

BY

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In view of the widespread use of drugs of the sulphanilamide group it is considered imperative to publish the following case.

Case History

A married woman, aged 24, previous ante-natal record normal, except for an attack of influenza in February of this year, was confined on May 31, 1939, in her own small flat. The birth was normal. The attendant was gloved and masked. A sterile drum of dressings was in use.

On June 2 at midnight, following the finding of a cockroach in the bed, the patient had an attack of hysterics and her temperature rose to 104°. In the morning the temperature was normal and continued so, with only small variations for the next six days. On June 10, however, it rose to 100°. A swab was taken from the vagina, and the morbidity was reported to the medical officer of health. The swab later was stated to be showing haemolytic streptococci Grade A.

On June 11 and 12 she received in all 3 grammes of prontosil album, and on the 13th, the temperature being normal, she was given one gramme only. Next day her temperature suddenly shot up to 103.6°, and she was seen by the senior of us in consultation. The patient looked ill, but not markedly anaemic; the tongue was brown and the uterus tender; the pulse rate was 140. She was urged to go to hospital, but for private reasons she refused. It was decided to move her into a room which was more airy and sunlit.

For the first twenty-four hours 6 grammes of sulphanilamide were ordered; for the second day 4 grammes; and for the third day 3 grammes, gradually lessening the dosage according to symptoms. The temperature subsided. She was indeed remarkably well, with no toxic symptoms whatever until June 25, when she had another rise of temperature which may or may not have been "drug fever." She was given on that and the following day 1 gramme of sulphanilamide, thrice daily, and on the 27th, as her general condition was much improved and the temperature normal (she was sitting up in bed manicuring her nails when seen that morning by her doctor), the drug was reduced to 1 gramme twice a day.

Next day, without any previous complaint or warning, she suddenly spoke of having a sore throat and feeling hot and husky. When seen by the senior of us, although the throat condition was not typical, being only red with oedematous tonsils, it seemed certain that hers was a case of threatening agranulocytic angina. The pulse was 140 and the temperature 104.6° On this occasion she was too ill to object to immediate removal to Queen Charlotte's isolation block.

CONDITION ON ADMISSION

The patient was very pale and ill-looking. She was fully conscious, and was hyperacute mentally; temperature 103.4°; pulse 140; respirations 26. The tongue was dry and rather "beefy" in appearance; mucous membranes were pale; there was no jaundice. Nothing abnormal was found in the abdomen, heart, or lungs. On vaginal examination the uterus was observed to be normal in size and mobility; the cervical canal was just patent, and there was no induration in the parametrium. Lochia were practically absent. The throat showed an acute follicular tonsillitis, the tonsils being much enlarged and engorged, and the pharyngeal wall red and slightly oedematous.

In view of the history and clinical findings a provisional diagnosis of agranulocytosis was made, this being confirmed by examination of a blood film, which showed a marked leucopenia and total absence of polymorphonuclear cells. At this time the haemoglobin was 67 per cent., leucocytes 850 per c.mm (lymphocytes 90 per cent.; monocytes 10 per cent.; no polymorphs seen in 150 white cells).

PROGRESS OF CASE

As soon as the diagnosis was confirmed 20 c.cm. of pentnucleotide was given by intramuscular injection and a continuous-drip blood transfusion by Marriott's method was started: 1,100 c.cm. of citrated blood was given in the next thirteen hours. The condition underwent no great change during the next twenty-four hours, but during the following afternoon a difference was noticed in the character of the voice, and a mild inspiratory stridor became evident. At this time there was a false membrane on the right tonsil, and severe oedema of the right arytenoid cartilage and the false cord on the same side. The vallecular surface of the epiglottis was also slightly oedematous. In view of this new development instruments were prepared for urgent tracheotomy, and inhalations of tinct. benz. co. given hourly. At the end of the transfusion the total leucocyte count had fallen to 680 per c.mm., the differential percentages remaining the same. The general condition had deteriorated slightly, and the pulse was very rapid and weak. The throat was sprayed with cocaine and adrenaline at intervals in an effort to reduce the oedema.

Twenty-eight hours after admission the temperature was 105.6° taken in the axilla, and the pulse 156. The stridor was rather more pronounced, but did not at any time warrant the desperate step of tracheotomy on a patient so ill. She remained wonderfully cheerful, and was making jokes and carrying on an intelligent conversation only ten minutes before she died, thirty-eight hours after admission.

The total amount of pentnucleotide given during the period in hospital was 100 c.cm. Had the true diagnosis not been made, this case would undoubtedly have been certified as an acute streptococcal septicaemia, and it seems probable that

several cases of agranulocytosis have been thus certified. Group A haemolytic streptococci were grown from the throat and the vagina of this patient at the time of admission, but the blood culture remained sterile.

POST-MORTEM EXAMINATION

Necropsy was held by Dr. C. Keith Simpson five and a half hours after death. There was no cyanosis or jaundice. The heart, lung, spleen, and liver were of congested appearance only. The generative organs showed no abnormality. The bone marrow of sternum and right humerus appeared normal. The faucial pillars, tonsils, and hypopharynx showed a sloughing gangrenous form of inflammation. There was oedema of the glottis.

The conclusions of Dr. Keith Simpson were that "the circumstances in this case afford strong presumptive evidence that the agranulocytosis was due to sulphonamide." He added: "This type of disease did not occur with streptococcal puerperal infections until treatment with this group of drugs came into use."

Discussion

This case presents many important features from the point of view of practice. In the few similar cases hitherto reported the average quantity of sulphanilamide that has been taken has been 58 grammes, and it has generally been taught that any quantity of the drug over 50 grammes was dangerous to patients already suffering from a disease which causes some destruction of blood corpuscles. This patient, however, received only 39½ grammes over a period of seventeen days, and although it is impossible to be sure that the agranulocytosis was due to the drug and not to the streptococcal infection, one must consider, in view of the post-mortem findings, that the blood condition was presumably caused by the sulphanilamide: though it is worth bearing in mind that fatigue, worry, and insomnia are, according to Reznikoff, definite features in the causation.

Johnston suggests that the duration of treatment is of even greater importance than the total dosage of the drug, but this case does not bear out his contention.

It is stated by Young that toxic or atypical symptoms in the course of treatment or after treatment should suggest the onset of leucopenia, but in this patient there were no toxic symptoms whatever beyond slight headache, and there was not even cyanosis; indeed, the only atypical occurrence was the short attack of possible "drug fever" on June 25. If this was "drug fever" it was not appreciated as such, for the following day the temperature was normal and the patient was sitting up in bed attending to her face and nail toilet.

It would appear, therefore, that, despite the wide use of this drug, there is a definite risk of agranulocytosis which cannot and must not be disregarded. It is probable that already fatal cases of puerperal fever have occurred with similar symptoms which have been certified as "streptococcal septicaemia" when in reality they have been due to the effect of sulphanilamide upon the haemopoietic system.

To obviate disaster—for we have no knowledge of a possible idiosyncrasy to this group of drugs—it is imperative that a complete blood count should be done, without waiting for symptoms, after 25 grammes of sulphanilamide have been exhibited. It is with this end in view that we are publishing this case.

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POST-OPERATIVE TREATMENT OF APPENDICULAR PERITONITIS WITH SULPHANILAMIDE AND ITS DERIVATIVES

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The organisms commonly cultured from the peritoneum in perforated appendicitis are *Bacillus coli*, haemolytic and non-haemolytic streptococci, and occasionally *B. welchii*, against all of which the drugs of the sulphanilamide group are effective. One of us (D. C. C.) has, since February, 1938, been using sulphanilamide in the post-operative treatment of acute appendicitis when the infection has spread beyond the appendix. Cokkinis (1938) concluded from using sulphanilamides in a group of forty cases of acute appendicitis that (*a*) they should not be employed in the first forty-eight hours of an attack; (*b*) they are of real value when the appendix has perforated or is necrosed: in such cases chemotherapy may rapidly clear up the peritoneal infection and prevent a prolonged illness and dangerous complications; (*c*) the most striking results have been obtained in late acute appendicitis with localized mass formation.

The drugs we originally used were soluseptasine followed by proseptasine. Soluseptasine was chosen as it can be given intravenously, intramuscularly, by the rectum, or by the mouth, and does not appear to be unduly toxic. Twelve to thirty-six hours after operation, when it was judged by the clinical condition and a steady or falling pulse rate that the peritoneal spread had been arrested, a change was made to the less toxic proseptasine. Since January, 1939, with the concurrence of the surgeons to the Radcliffe Infirmary, we have been using sulphanilamide in the post-operative treatment of their cases. The total number of cases of general peritonitis has been twenty-six, with a mortality of three (11.5 per cent.). There have been fifteen cases of appendix abscess with no deaths. This series is far too small for any statistical conclusion to be drawn, but it is the clinical experience of all users that sulphanilamide is of value.

Previously published figures of the mortality rate in general peritonitis vary in different series from 17.7 per cent. (Hunter, 1927) to 33 per cent. (Reid *et al.*, 1936). The most recent figures for London hospitals vary from 19 to 24 per cent. (Young and Russell, 1939). This variation is possibly due to the different standards taken in describing what is known as general peritonitis. A surgeon viewing a limited part of the general peritoneal cavity can only say that there is a spreading peritonitis with pus free among the coils of small intestine. This pus may under the microscope show numerous pus cells but no organisms, and prove sterile on culture. In this series of cases of general peritonitis only those have been included in which pus lying free between coils of small intestine either smelt foul or showed organisms in direct smears and culture.

Dosage

Soluseptasine and Proseptasine.—Soluseptasine 0.5 gramme, four-hourly, three doses, either intramuscularly or added to the intravenous saline. Soluseptasine 0.5 gramme, six-hourly, given as above, or per rectum or by mouth. As soon as the patient is doing well clinically change to proseptasine, 1 gramme (2 tablets) thrice daily by mouth, until the temperature is normal for twenty-four hours. This dosage may appear small, but it was apparently successful. The time of administration was short as compared with that normally used in streptococcal septicaemia and pneumonia. It was thought that in an appendicular peritonitis where the source of infection has been removed conditions were different from those of a blood infection, and a recrudescence due to cessation of treatment was unlikely.

Sulphanilamide.—This preparation was given as follows:

In theatre: 10 c.cm. of 5% solution intramuscularly—0.5 gm.
1 hour: Rectal saline 10 oz. with 2 crushed tablets—1 gm.
2 hour: 10 c.cm. of 5% solution intramuscularly
4 hour: By mouth, 1 tablet—0.5 gm.
7 hour: Rectal saline with 2 tablets—1 gm.
11 hour: By mouth, 2 tablets—1 gm.
13 hour: Rectal saline with 1 crushed tablet—0.5 gm.
15 hour: 0.5 gm. by mouth
19 hour: 0.5 gm. „ „
23 hour: 0.5 gm. „ „

Second, third, and fourth days: Give 2 tablets—1 gm.—by mouth t.d.s.

Fourth, sixth, and seventh days: Give 1 tablet—0.5 gm.—by mouth t.d.s.

Estimations by the method of Werner (1939) of the concentration of the sulphanilamide in the blood following the above routine dosage are given in table form as follows:

Case No	Hours after Operation	Sulphanilamide (mg.%)
21	6	1.8
22	6	2.7
23	6	2.9
20	8	2.3
21	12	2.7
33	12	5.0
36	14	4.0
34	16	4.1
36	24	5.0
20	32	4.9
20	56	5.1
33	96	4.2
36	108	5.3

Discussion of Cases

Case 15 and Case 24.—In both these cases necropsy showed no pus in the peritoneum, although pre-operatively they had been severe cases of general peritonitis, and operation had confirmed severe infection of the peritoneum. Death was due to fibrinous adhesions in the last coil of small intestine, associated as it often is with paralytic obstruction of the small intestine above. Patient No. 15 would not co-operate in treatment, and continually pulled out his Ryle's tube. He was mentally confused at night. Case 24 had cyanosis, nausea, and vomiting at twenty hours. This was thought to be due to the sulphanilamide. At forty-eight hours it became obvious that

Table giving Particulars of Cases of General Peritonitis

Case No.	Age	Length of History	Operative Findings	Culture from Peritoneum	Dosage	Complications	Recovery
1	19	7 days	Perforated pelvic; free foul pus from rupture of appendix abscess 12 hours previously	B. coli	Soluseptasine 0.5 gm. into continuous intravenous saline, 3 doses 4-hourly, then 3 doses 6-hourly Proseptasine 1 gm. t.d.s., 2 days	Left anterior subphrenic abscess drained	Yes
2	19	2 days	Perforated pelvic appendix	B. coli; non-haemolytic streptococci	Soluseptasine 0.5 gm. into intravenous saline, 3 doses 4-hourly, then 3 doses 6-hourly; then proseptasine 1 gm. t.d.s., 3 days	None	„
3	46	3 days	Perforated appendix: paracolic Foul-smelling pus		0.5 gm. soluseptasine intramuscularly, 4 doses Proseptasine 1 gm. t.d.s., 2 days	5th day post-operative obstruction. Ryle's tube and continuous drainage of stomach. Intravenous saline. 9th day, ileostomy. 14th day, laparotomy; adhesions divided	
4	33	36 hours	Perforated pelvic appendix from history perforation 11 hours before operation	B. coli; non-haemolytic streptococci	0.5 gm. soluseptasine intramuscularly, 3 doses. Soluseptasine 0.5 gm. 4-hourly in tap-water rectally, 3 doses Proseptasine, 2 days	None	„
5	55	2 days	Perforated appendix behind ileum Pus foul-smelling		Soluseptasine 0.5 gm. intramuscularly, 2 doses Proseptasine 1 gm. t.d.s., 3 days	14th day abscess left superficial inguinal glands incised	„
6	7	30 hours	Pelvic appendix	B. coli	Sulphapyridine (M and B 693) 0.5 gm. intramuscularly, 2 doses 4-hourly 0.5 gm. 4-hourly, 3 days 0.25 gm. 4-hourly, 4 days		„
7	46	48 hours	Perforated appendix	B. coli; streptococci	Soluseptasine 1 gm. intramuscularly Proseptasine 1 gm. t.d.s., 24 hours; proseptasine 0.5 gm. t.d.s., 2 days	None	
8	38	3 days	Pus foul		Soluseptasine 0.5 gm. 3 doses 4-hourly Proseptasine 1 gm. t.d.s., 3 days		„
9	4½	36 hours	Perforated Thick pus	B. coli	0.5 gm. soluseptasine intramuscularly, 2 doses 4-hourly 0.5 gm. soluseptasine in tap-water rectally, 2 doses 4-hourly Sulphapyridine 0.5 gm. 6-hourly, 5 days	Infarct in kidney 12th day	

Table giving Particulars of Cases of General Peritonitis (continued)

Case No.	Age	Length of History	Operative Findings	Culture from Peritoneum	Dosage	Complications	Recovery
10	62	24 hours	Perforated Foul pus	B. coli Non-haemolytic streptococci	0.5 gm. soluseptasine intramuscularly, 3 doses 4-hourly 0.5 gm. soluseptasine into intravenous saline, 4 doses 6-hourly 0.5 gm. soluseptasine intramuscularly, 12-hourly for 3 days	18 hours' faeculent vomiting. Paralytic ileus. Continuous stomach drainage. Continuous intravenous saline. Bowels open 36 hours after operation with eserine and pitressin. 5th day colicky pain, renewal vomit. Bowels open after 500 ccm. 10 per cent. saline intravenously, when other measures had failed	Yes
11	38	36 hours	Perforated Thin pus	B. coli	Soluseptasine, i.-m. 1 gm. 3 doses 4-hourly Proseptasine 1 gm. t.d.s., 3 days Patient felt depressed 5th day. Proseptasine stopped	None	,,
12	62	48 hours	Gangrenous Thick pus, chiefly in pelvis Thin pus lower abdomen	B. coli	Soluseptasine, i.-m. 0.5 gm. 3 doses 4 hourly Soluseptasine 0.5 gm. 3 doses 4-hourly, by mouth Proseptasine 1 gm. t.d.s.	,,	,,
13	4	60 hours	Pelvic. Thick pus, foul		Soluseptasine 0.5 gm. 6-hourly, 1 day Sulphapyridine 0.25 gm. 6-hourly, 4 days	,,	,,
14	28	48 hours	Paracolic	B. coli	Soluseptasine 0.5 gm. 4-hourly, 3 doses Proseptasine 1 gm. t.d.s., 2 days	,,	,,
15	36	4 days	Perforated	B. coli Non-haemolytic streptococci	Soluseptasine 0.5 gm. 4-hourly, into intravenous saline, 9 doses	Paralytic ileus. Non-cooperative. Would not keep Ryle's tube in stomach	No.—P.M.: No pus in peritoneum. Fibrinous adhesions last loop of ileum. Paralytic ileus above diffuse bronchopneumonia
16	10	4 days	Perforated	B. coli Non-haemolytic streptococci	Soluseptasine 0.5 gm. i.-m. on return to ward Proseptasine ½ gm., 3 doses p.r. in tap-water		Yes
17	37	Pain 14 days Severe 2 days	Perforated		Soluseptasine 1 gm. i.-m. Proseptasine 1 gm. 4-hourly in tap-water. P.R. for 36 hours Soluseptasine 1 gm. 8-hourly into intravenous saline started 5th day	5th day vomited large quantity. Ryle's tube. Continuous drainage. Intravenous saline	No.—P.M.: Much pus free in lower abdomen. No undue distension of small intestine
18	8	38 hours	General peritonitis. Appendicectomy with drainage	B. coli Haemolytic streptococci	Sulphanilamide 2½ per cent. 5 c.cm. i.-m. every 4 hours, 3 doses Sulphanilamide ½ tablet (0.25 gm.) every 4 hours for 48 hours	None	Yes
19	3	2—3 weeks	General peritonitis. Appendicectomy with drainage	B. coli Streptococci Very few Cl. welchii	Sulphanilamide 5 gms. 3 times a day for 6 days	,,	,,
20	23	16 hours	General peritonitis. Appendicectomy with drainage	Slight growth of anaerobic bacteria	Sulphanilamide 1 gm., 4-hourly for 3 days	,,	,,
21	28	22 hours	General peritonitis. Appendicectomy with drainage	B. coli Haemolytic streptococci	Standard sulphanilamide	,,	,,
22	35	4 days	General peritonitis. Appendicectomy with drainage	19/5/39: Haemolytic streptococci; B. coli 25/5/39: Haemolytic streptococci; B. coli 27/5/39: Haemolytic streptococci; B. coli	Standard sulphanilamide	,,	,,
23	29	1 week	General peritonitis. Drainage only	Large number of Gram-positive cocci and bacilli. Moderate growth of streptococci faecalis	Standard sulphanilamide	,,	,,
24	50	24 hours	General peritonitis. Appendicectomy with drainage	Coliform organisms in large numbers. Very few haemolytic streptococci, and many non-haemolytic streptococci	Sulphanilamide 10 c.cm. i.-v. Sulphanilamide 20 c.cm. i.-m. 1 gm. 4-hourly for 3 days, into rectal saline	Paralytic ileus	No.—P.M.: Paralytic ileus
25	18	36 hours	General peritonitis. Appendicectomy with drainage		Sulphanilamide, 1 gm. 4-hourly for 24 hours before operation Sulphanilamide, 1 gm. t.d.s. for 4 days	None	Yes
26	66	42 hours	General peritonitis. Appendicectomy with drainage	B. coli Non-haemolytic streptococci	Standard sulphanilamide	Nil	,,

the patient had paralytic ileus, and the drug was stopped. The following blood sulphanilamide estimations were made:

Hours after Operation	Sulphanilamide Conc. (mg.%)
8	2.9
16	4.9
28	5.8
67	7.4
113	7.0

It will be seen that the blood concentration of sulphanilamide rose after cessation of administration, due to vomiting and oliguria. This patient was mentally confused and would not keep down his Ryle's tube.

Case 17.—This is the only case of spreading peritonitis in the series in which the patient died with a general lower abdomen peritonitis. The dosage of soluseptasine was one gramme intramuscularly immediately after operation,

Cases of Abscess not up to Abdominal Wall (Appendix removed)

Case No.	Age	Length of History	Operative Findings	Culture	Dosage	Complications	Recovery
27	18	8 days treated as typhoid. Palpable mass, pain, vomiting	Pelvic abscess	Bubbles seen in pus 36 hours after operation. Smear culture B. welchii	Proseptasine 1 gm. in tap-water p.r., 2 doses; then by mouth Anti-gas-gangrene serum Sulphanilamide 1 gm. 4-hourly, 6 doses; 0.5 gm. 6-hourly, 2 days		Yes
28	68	3 days	Retrocaecal		Soluseptasine 0.5 gm. i.-m. 1 dose; p.r. 2 doses Proseptasine 1 gm. thrice daily, 2 days	None	,,
29	14	4 days	Pelvic	48 hours after operation few bubbles of gas seen in pus. Smear and culture B. welchii	Proseptasine 1 gm. 4-hourly in tap-water p.r., 2 doses; then 1 gm. thrice daily by mouth Anti-gas serum Sulphanilamide 1 gm. 4-hourly, 6 doses Sulphanilamide 0.5 gm. 6-hourly, 8 doses Sulphanilamide 0.5 gm. t.d.s., 3 days Some blueness		,,
30		80 hours	Pelvic abscess. Thick foul pus in pelvis. Thin pus paracolic		Soluseptasine 0.5 gm. i.-m., 4 doses, 4-hourly Soluseptasine 0.5 gm. i.-m., 3 doses, 6-hourly		,,
31	25	3 days	Abscess. Foul pus and gas. Appendix not removed		Soluseptasine 1 gm. Proseptasine 1 gm. in tap-water, 4-hourly, 6 doses Proseptasine 1 gm. by mouth thrice daily, 8 days		,,
32	5	4 days	Pelvic abscess. Foul pus		Continuous intravenous saline Soluseptasine 0.25 gm., 4 doses, 4-hourly, into intravenous saline; 0.25 gm., 3 doses, 8-hourly, into intravenous saline Proseptasine 0.25 gm., thrice daily, 5 days		,, Discharged 18th day; wound dry
33	25	72 hours	Local peritonitis. Appendicectomy with drainage	Numerous coliform organisms and few positive cocci	Standard sulphanilamide	,,	Yes
34	28	72 hours	Local peritonitis. Appendicectomy with drainage	B. coli; haemolytic streptococci	Standard sulphanilamide	,,	,,
35	6	48 hours	Local peritonitis. Appendicectomy with drainage	B. coli	10 c.cm. sulphanilamide i.-v. in theatre; 1½ hours, saline, and sulphanilamide, 0.5 gm. p.r.; 2 hours, sulphanilamide, 5 c.cm. i.-m.; 4 hours, sulphanilamide, 0.25 gm. by mouth; 7 hours, saline and sulphanilamide, 0.5 gm. p.r.; 0.25 gm., 4-hourly, by mouth, 4 days	,,	,,
36	22	96 hours	Local peritonitis. Appendicectomy with drainage	Gram-positive bacilli and cocci. Many actinomycotic organisms	Standard sulphanilamide	,,	,,
37	21	14 days	Local peritonitis. Appendicectomy with drainage	Numerous streptococci; a few B. coli; a few Gram-positive bacilli	Sulphanilamide 2½ per cent. solution, 10 c.cm. i.-m., two doses for 4 hours, followed by 1 gm. every 4 hours, for 48 hours	,,	,,
38	10	36 hours	Local peritonitis. Appendicectomy with drainage	Prolific growth of B. coli	Sulphanilamide 2½ per cent. i.-m., 3 c.cm. every 4 hours, 3 doses; 0.25 gm. (¼ tablet) by mouth every 4 hours, for 48 hours	,,	,,
39	16	12 hours	Local peritonitis. Appendicectomy with drainage	B. coli; haemolytic streptococci	Sulphanilamide 1 gm. 4-hourly orally for 24 hours; then 1 gm., thrice daily for 3 days	,,	,,
40	21	8 hours	Local peritonitis. Appendicectomy with drainage	B. coli; haemolytic streptococci	Soluseptasine 1 gm. i.-m. on return from theatre; 0.5 gm. soluseptasine in rectal salines 4-hourly, 3 doses; soluseptasine 0.5 gm. 6-hourly by mouth, 4 doses; proseptasine 1 gm. t.d.s. 2 days	,,	,,
41	39	26 hours	Local peritonitis. Appendicectomy with drainage	Few staphylococci	Sulphanilamide p.r. 1 gm. every 4 hours for 48 hours	,,	,,

followed by one gramme of proseptasine four-hourly per rectum for thirty-six hours. The treatment adopted in the majority of the other cases, of giving 0.5 gramme of sulphanilamide at four-hourly intervals for at least twelve hours, appears to be the better one. The organisms in this case are not known.

Case 23.—Eighth day. Advanced general peritonitis. Patient's general condition extremely bad. Pus sucked out of pelvis drainage-tube into pelvis. Appendix not looked for. Sulphanilamide: recovery.

Case 25.—This case was considered by the surgeon in charge to be one of pelvic peritonitis due to infected Fallopian tubes. She was put on regular sulphanilamide. Her pelvic abscess burst into the peritoneum, and at operation, half an hour later, rupture was found to be due to a pelvic appendicitis. Her post-operative course, instead of being stormy, was amazingly smooth, and this was attributed to the previous sulphanilamide.

Case 27 and Case 29.—These two cases of abscess, which showed *B. welchii* in the discharge on the second day after operation, ran a normal course. As soon as the organism was identified in a direct smear anti-gas-gangrene serum and sulphanilamide were given. In the first case bubbles ceased to appear in the pus after two days' treatment with sulphanilamide. In the second case bubbles ceased to appear in the pus after six days' treatment with sulphanilamide. Whether the sulphanilamide was of value is debatable. It has been used with success in gas-gangrene infections in muscle, and one of us has used it in such a case. In these two appendix abscesses it was used to stop the spread of gas-formers in the retroperitoneal tissues such as one sees in some post-mortem cases of appendix abscesses.

Case 33.—Slight nausea and cyanosis, which disappeared at ninety-six hours.

Case 36.—This patient was cyanosed at forty-eight hours, and sulphanilamide was stopped at 110 hours owing to vomiting.

Case 37.—Nausea caused sulphanilamide to be stopped at thirty-two hours.

Case 40.—Nausea caused sulphanilamide to be stopped at twenty-two hours.

Results

Sulphanilamide was used when the infection was confined to the appendix, as removal of the appendix terminates the infection. There were 232 such cases in this series; they were treated by appendicectomy without sulphanilamide, and there was no mortality. Twenty-six cases of general peritonitis from appendicitis are presented, with three deaths. Of the patients who died, only one at necropsy still had a general lower abdominal peritonitis, and this case had been given what we regard as an adequate dosage of sulphanilamide. In addition there are fifteen cases of abscess, with no deaths. The series therefore consists of 273 cases of acute appendicitis with three deaths, corresponding to a mortality of 1.1 per cent. The number of cases of acute appendicitis in the five-year period 1934–8 in the Radcliffe Infirmary was 1,131 with sixty deaths, corresponding to a mortality of 5.3 per cent.

It would appear that soluseptasine and proseptasine presented fewer toxic symptoms than sulphanilamide, but sulphanilamide was given in a larger dosage and for a longer period. When toxicity due to sulphanilamide occurs the drug must be stopped. It will be noticed that in several cases anaerobic and actinomycotic organisms were present in the peritoneal cavity. Sulphanilamide has been of value against these organisms elsewhere in the body, and it is reasonable to suppose that it is of value in appendicular peritonitis. The sulphanilamide used was that known under the name of streptocide. In order to reduce the bulk of the intramuscular injection, Messrs. Evans Sons Lescher and Webb supplied a special 5 per cent. solution which became fully soluble when warmed to blood heat. It was warmed before injection.

Summary

A series of twenty-six cases of general peritonitis and fifteen cases of appendix abscess were treated with sulphanilamide and its derivatives.

The method of treatment is discussed, together with the drug dosage.

Several cases are reviewed in full, and particulars of the series of forty-one cases are tabulated.

The results of the treatment are given, along with the conclusions to be drawn.

We would like to express our thanks to Mr. H. A. B. Whitelocke, Mr. D. A. Abernethy, and Mr. A. Elliot-Smith for permission to use sulphanilamide on their cases and to publish the results.

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Clinical Memoranda

Agranulocytosis after Sulphanilamide: Recovery

The following case is reported in which a rapid and uninterrupted recovery was made after treatment with pentnucleotide. The value of doing a blood count on a patient who receives sulphanilamide and who shows an atypical response to treatment is demonstrated. This case adds another to the list recorded by Johnston (1938).

CASE REPORT

A married woman was admitted to hospital on November 16, 1938, as a case of puerperal fever. She gave a history of having been delivered of a full-time 9-lb. child eight days previously. Instruments had not been used. A small perineal tear had had two stitches inserted in it. On the third day after delivery the temperature was 99°, and was thought to be due to a "cold" which she then had. The evening before admission the temperature was 99.6°, and on the day of admission she had a rigor and a temperature of 102° F.

On admission she was found to be a well-built woman of 30. Her colour was good, and she made no definite complaint. The uterus was subinvoluted, firm, and the fundus lay midway between the symphysis pubis and the umbilicus; temperature 100.1°, pulse 86, respirations 36. She was given vaginal douches and intra-uterine glycerin. A swab was taken from the cervix, and this was cultured for haemolytic streptococci; none were discovered. The following evening the temperature had risen to 103°, and it was decided to commence the administration of sulphanilamide. This was given four-hourly in 1-gramme doses and was continued until December 1, 76 grammes in all being given. The patient had rigors on November 20, 21, 23, 27, 28, and 30, and

on December 1. At no time was any organism discovered in blood culture. The temperature was constantly raised, and varied between 99° and 103.5°. The pulse varied from 102 to 144. On November 30 she developed a generalized sulphanilamide rash, and on December 2 there was oedema of the left ankle, thought to be due to a deep femoral thrombosis.

On December 3 her temperature was normal, but from then until December 7 it rose in a staircase manner to 103.4°. She made no definite complaint. A blood count on December 7 revealed a condition of agranulocytosis. Her throat was then normal in appearance. On the 8th she complained of sore throat, and a patch of exudate was present on the left tonsil. A further blood count gave the following result: haemoglobin, 45 per cent.; red cells, 2,590,000 per c.mm.; colour index, 0.9; white cells, 1,400 per c.mm.—polymorphs 8 per cent., lymphocytes 73 per cent., monocytes 18 per cent., eosinophils 1 per cent.; polymorphs all mature.

Treatment was instituted at once with pentnucleotide, in 10-c.cm. doses intramuscularly. Two doses were given on December 8 and one dose the following morning. A transfusion of 600 c.cm. of citrated blood was given on the evening of the 9th. Pentnucleotide was continued, 20 c.cm. being given on the 10th, 30 c.cm. on the 11th, 12th, and 13th, 20 c.cm. on the 14th, and 10 c.cm. on the 15th, when treatment was stopped. Altogether 170 c.cm. was given. At the same time 2 c.cm. of campolon and 9 grains of ferrous sulphate were given daily. From December 8 the temperature fell in a staircase manner and was almost normal by December 15, though still elevated in the evening. By that time also the throat was better. Blood counts—December 13: white cells, 5,000 per c.mm.—polymorphs 67 per cent., lymphocytes 22 per cent., monocytes 11 per cent. December 19: white cells, 22,978 per c.mm.—polymorphs 80.1 per cent., lymphocytes 13.8 per cent., monocytes 6.1 per cent.

From December 15 she made slow but uninterrupted progress, and was finally discharged from hospital on February 3, 1939, when, apart from a fair amount of residual swelling of the left leg, she was well. Blood count on January 1, 1939: red cells, 4,000,000 per c.mm.; haemoglobin, 75 per cent.; white cells, 6,280 per c.mm.—normal differential count.

We are indebted to Dr. Duncan Forbes for permission to publish this case.

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Recovery in a Case showing the Features of Acute Myeloblastic Leukaemia

The following case, showing the clinical and haematological features of acute myeloblastic leukaemia and ending in recovery, is, I think, worthy of record.

CASE HISTORY

The patient, a girl aged 11, was first seen on April 20, 1938, on account of epistaxis. This responded to plugging of the nares. She was seen again on the 22nd, as she complained of difficult and infrequent micturition. The urine was dark in colour and was found to contain blood. Next day she was admitted to Harrow Hospital for investigation.

On examination there was marked pallor of the skin and mucous membranes, and petechial haemorrhages were observed on the back of the left hand and on the right knee. The gums were bleeding, especially in the region of the upper central incisors. Glands, discrete and movable, were present in the neck, in the left axilla, and in both groins. The urine contained blood and albumin. The respiratory and alimentary systems showed no appreciable disease. The spleen was not palpable. Blood pressure was 110/50, and the pulse 120, regular. A systolic basal murmur was present. On April 25 a blood examination showed: red cells, 3,210,000 per c.mm.; haemoglobin, 58 per cent.; colour index, 0.9; white cells, 10,600 per c.mm.—polymorphonuclears 7 per cent., lymphocytes 6 per cent., myeloblasts 87 per cent. The red cells showed a moderately increased degree of anisocytosis and poikilocytosis; a few cells exhibited polychromatophilic staining, but no nucleated forms were seen. As judged by the appearance in films the platelets were reduced in numbers. The blood findings suggested acute myeloblastic leukaemia. On May 1 blood was oozing from the right ear. It was seen to be coming from the anterior wall of the external meatus close to the membrane.

In view of the almost invariably fatal termination of acute leukaemia and its frequent resemblance to an acute infection, it was thought worth while to try the effect of prontosil album in this case. Accordingly, 7½ grains (0.5 gramme) was given twice daily from April 29 to May 11, when it was stopped owing to the onset of cyanosis. It was resumed on May 16 for five days. Since her admission she had been running a variable temperature. By May 11 the right ear was dry and there was only slight oozing of blood from the gums. This gradually cleared up. On May 26, there being no further haemorrhages and the temperature being normal, the girl returned home.

On May 17 a blood count revealed: red cells, 3,590,000 per c.mm; haemoglobin, 62 per cent.; colour index, 0.88; leucocytes, 5,400 per c.mm. On May 25 a differential leucocyte count gave: polymorphonuclears, 62 per cent.; lymphocytes, 31 per cent.; large mononuclears, 4 per cent.; basophils, *nil*; eosinophils, 3 per cent. No immature leucocytes were present. On May 27 a differential count of 300 leucocytes yielded: polymorphonuclears, 50 per cent.; lymphocytes, 42 per cent.; large mononuclears, 4 per cent.; eosinophils, 2 per cent.; basophils, *nil*; neutrophil myelocytes, 2 per cent. From the day of discharge from hospital the child's general condition gradually improved, and she returned to school in September, 1938.

Further blood counts were as follows: June 6, 1938: red cells, 4,390,000 per c.mm.—no abnormal cells; haemoglobin, 72 per cent.; colour index, 0.83; white cells, 5,800 per c.mm.—no immature leucocytes; polymorphonuclears 38 per cent., lymphocytes 55 per cent., large mononuclears 5 per cent., basophils *nil*, eosinophils 2 per cent. October 12: red cells, 4,830,000 per c.mm.—no abnormal cells; haemoglobin, 94 per cent.; colour index, 0.97; white cells, 4,600 per c.mm.—no immature leucocytes; polymorphonuclears 40 per cent., lymphocytes 54 per cent., large mononuclears 4 per cent., basophils 1 per cent., eosinophils 1 per cent. January 6, 1939: leucocytes, 4,400 per c.mm.—no immature leucocytes; polymorphonuclears 47 per cent., lymphocytes 50 per cent., large mononuclears 2 per cent., basophils *nil*, eosinophils 1 per cent. April 4, 1939: red cells, 4,530,000 per c.mm.—no abnormal cells; haemoglobin, 90 per cent.; colour index, 1.0; white cells, 4,000 per c.mm.—no immature leucocytes; polymorphonuclears 36 per cent., lymphocytes 54 per cent., large mononuclears 6 per cent., basophils 1 per cent., eosinophils 3 per cent.

The only drugs given, apart from the prontosil album, were a short course of liq. arsenicalis, 2 minims thrice daily, and 1 tablet of fersolate, three times daily, for three months.

The interesting features of the case are: (1) Was this a case of acute myeloblastic leukaemia or one of the recoverable ill-defined blood diseases of children? (2) Was the improvement and ultimate recovery due to the prontosil?

My grateful thanks are due to Dr. K. H. Tallerman, who saw the case in consultation, and to Dr. H. F. Brewer of the Clinical Research Department, St. Bartholomew's Hospital, for the blood examinations and reports.

Harrow-on-the-Hill. J. DEAKIN HUGHES, M.B., Ch.B.

Reviews

TWO WOMEN PIONEERS

Margaret Sanger. An Autobiography. (Pp. 494; frontispiece. 16s. net.) London: Victor Gollancz. 1939.

Elizabeth Garrett Anderson, 1836–1917. By Louisa Garrett Anderson. (Pp. 338; 8 illustrations, including a frontispiece. 10s. 6d. net.) London: Faber and Faber. 1939.

The crust formed by human habit and inertia over any belief or custom is so tough that every advance has to be heralded by pioneers of superhuman energy, patience, and courage. Some are like thin blue lambent flames, flickering ardently, consuming themselves and everyone around them as they burn up the dross. Such was Margaret Sanger, whose lengthy autobiography tells the story of the birth control movement in three continents. She was the child of a tuberculous mother who bore eleven ten-pound babies, "without mark or blemish," and coughed and gasped her way through forty years of active life; and she had for father a red-headed Irish nonconformist—a philosopher, a rebel, an artist, and a monumental mason. Childhood was on the borderline of starvation; and in adolescence the family disease affected her. Despite innumerable difficulties she trained as a nurse, married—briefly—the architect-artist Bill Sanger, and bore him three children. But nowhere did she take root. Both she and her husband were soon immersed in the Left-Wing movement in New York. Health talks to women led to articles on "What Every Girl Should Know," and to the first conflict with authority. The Post Office Department censored an entire article because the words "gonorrhoea" and "syphilis" appeared in it. Practising as a nurse on Lower East Side, Margaret Sanger's passion for humanity took fire from the terrible lives and deaths of the overburdened mothers who, "always ailing, never failing," were destined for the scrapheap by the age of 35. The poor were convinced that the rich had a secret method of conception control, and went to agonizing lengths to extract it from the nurse. The death of the 28-year-old wife of a truck driver, following a second abortion, determined Mrs. Sanger's future. She knew that she could no longer stand by and watch "such monstrous atrocities"; she was resolved to do something "to change the destiny of mothers whose miseries were vast as the sky." The book describes an interminable series of conflicts with public opinion, vested interest, prejudice, poverty, and the law. Fighting the battle of free speech as a side-line, Mrs. Sanger appeared before the courts, failed to get a fair hearing, went into exile, went to prison. She toured Europe and Asia, often under suspicion, often treated as an "undesirable," often welcomed with abundant warmth and courtesy. In post-blockade Germany she found a general agreement that for the time being the population should be limited, and abortions were being widely performed. She thought this a fertile and friendly soil, but one doctor she approached replied indignantly:

"Nobody who has the welfare of Germany at heart could talk to me as you have this morning. Only enemies could come here to give such information to our women."

I wished he would sit down; he made me nervous. But I went on. "Why is it such an act of enmity to advocate contraceptives rather than abortions? Abortions, as you know yourself, may be quite dangerous, whereas reliable contraceptives are harmless. Why do you oppose them?"

To my horror he replied, "We will never give over the control of our numbers to the women themselves. What, let them control the future of the human race? With abortions it is in our hands; we make the decisions, and they must come to us."

That was not the tone of this doctor alone but also that of most of his confreres.

In Japan Margaret Sanger saw the seeds of the present war springing to flower in deliberate over-population. She went everywhere, met everybody, and in due course saw in England and America response to her long effort. She believes that population control alone can solve the international problems of to-day.

There is another kind of pioneer: one who shows no less high courage and patient determination, but who does not come into such acute conflict with the established order. Of this type was Elizabeth Garrett, whose story is told by her daughter, Louisa Garrett Anderson. Despite all her efforts in the service of woman's emancipation, despite the courage of that wide mouth and firm chin, despite abuse, misunderstanding, and opposition, the words that linger in the mind about Elizabeth Garrett are "comfortable," "respectable," "placid." Her parents were of that intelligent middle class which characterized mid-Victorian England; both her father and her husband cherished and supported her pioneer projects. She lived a peaceful and happy private life amidst all the turmoil of School Board elections and hospital rebuffs. Is it that this biography slurs over too much? The dust-cover describes it as "full," but full it certainly is not. There are gaps that curiosity burns to fill, and a very large part of it is in the form of letters. One thing that emerges clearly is her lovableness. Despite the rather prejudiced curves in the pursed-up mouth of later years, Elizabeth Garrett Anderson was a personality whom to meet for three minutes was to love and to respect. This shines through the book.

These two pioneers represent, perhaps very largely, the peculiar genius of the two countries which gave them birth. Medical men and women should read both books—even though they itch to cut down one and expand the other. Both are well written, pleasant to read, and contain lessons that ought not to be forgotten.

ELECTRO SURGERY

Clinical Electrosurgery. By Gustavus M. Blech, M.D., LL.D. With chapters by Hector Alfred Colwell, M.B., Ph.D., M.R.C.P., and Brian Wellington Windeyer, M.B., B.S., F.R.C.S., D.M.R.E. (Pp. 389; 34 figures. 21s. net.) London: Oxford University Press. 1939.

This book introduces to general surgeons and those who occasionally operate the advantages, indications, limitations, and applications of modern electrosurgical methods. There is first a glossary of electrotechnical terms, included in order that the theoretical considerations of the subject may be limited to the barest fundamentals. This book is of an essentially practical character, and well summarizes in compact form present knowledge of the use of high-frequency currents for incision and coagulation. One of the best written and most interesting sections is the chapter on the historical development of electrosurgery, in which we are told that Joseph Henry's discovery in 1842 that the discharge from a Leyden jar is oscillating in character forms the basis of the production of high-frequency currents. From this d'Arsonval in 1881 produced an apparatus capable of yielding alternations up to 10,000 per second, and it was found that neuromuscular responses gradually disappear after a periodicity above 3,000 per second. Although Czerny and others published some early reports of excision of cancerous lesions by the high-frequency current, it is to Wyeth in America to whom the credit is given

for first constructing an apparatus capable of yielding an easily controlled current, and it was Wyeth who first used the term "endotherm knife." The authors of this book tell us that though at present we have ready means of operating with high-frequency currents, the ideal apparatus has yet to be devised—a statement with which many surgeons will concur.

The account of the historical development is followed by a discussion of the various electrosurgical procedures, the varieties of apparatus, the indications for and limitations of electrosurgery, and an account of general technique. Then follows a detailed consideration of the applications of electrosurgical methods to various regions of the body—for example, for neurological and thoracic operations, in ear, nose, and throat surgery, for abdominal operations, and those performed on the face and neck. The importance of an electrosurgical unit to the neurological surgeon is fully considered, and due tribute paid to Harvey Cushing, who in 1928 introduced these methods to this branch of surgery; but, while this chapter gives us a very fair outline of modern neurosurgical methods, the description of the operative treatment of trigeminal neuralgia is out of date. We might reasonably expect to find here mention of the Frazier, Dandy, and Sjoqvist operations, which have superseded direct attacks on the Gasserian ganglion, with much advantage both to the patient and to the surgeon.

Printing and type are clear on paper so highly glazed that in strong light reading is trying; and the weight is high for the convenient size of the book. The illustrations are chiefly photographs of pioneers and of pieces of apparatus. The book gives the reader a good outline picture of the present position of a subject which should be familiar to all who aspire to practise modern surgery.

SURGICAL APPLIED ANATOMY

Surgical Applied Anatomy. By Sir Frederick Treves, Bt. Tenth edition, revised by Lambert Rogers, M.Sc., F.R.C.S., F.R.C.S.Ed., F.R.A.C.S., F.A.C.S. (Pp. 748; 192 figures, 66 of which are coloured. 14s. net.) London: Cassell and Company. 1939.

The publication of the tenth edition of Treves's *Surgical Applied Anatomy,* revised by Professor Lambert Rogers, is a gratifying evidence of the truth of Darwin's dictum of the survival of the fittest. Concise, accurate, and brimful of information, this book has held its own among numerous competitors for over half a century. Its small size and clear-cut diagrams, and the fact that the original author and the distinguished teachers who have succeeded him have themselves not only been teachers of anatomy but have been actively engaged in surgical work or intimately connected with such work, fully account for its practical nature and general popularity. The tenth edition includes a great deal of new matter, scattered through its pages, but more especially in the sections on the orbital cavity and eye; the ear, nose, and throat; the abdominal and thoracic viscera; and the spinal and sympathetic nervous systems. One is glad to see that some of the old familiar names are still employed as alternatives to the modern terms, since many of the older names are still retained in conversational use, though banished from some of the modern anatomical textbooks. A candidate who has read this book will thus have become acquainted with some of the old historical names, such as Gimbernat's and Poupart's ligaments and the Y-shaped ligament of Bigelow—which otherwise, it is quite possible, he may not have heard until he presents himself for an oral examination. Quite apart from its use from the examination standpoint, Treves's *Surgical Applied Anatomy,* owing to its graphic incisive style and illustrative descriptions of actual cases, is a book which appeals to all medical students as being a valuable aid to their everyday work both at the present time and in the future.

THE OPERA OMNIA OF PASTEUR

Oeuvres de Pasteur. Mélanges Scientifiques et Littéraires. Collected by Pasteur Vallery-Radot. Volume VII. (Pp. 666; 200 fr.) Paris: Masson et Cie. 1939.

Professor Pasteur Vallery-Radot is to be congratulated on what to him must have been a real labour of love—the completion of the collected works of Pasteur. The seventh and last volume shows that little will be left for subsequent gleaners. It contains various papers and addresses—scientific and literary—which Pasteur delivered at various times and in divers places. They show the master, in a light well known to his devoted pupils, as one who thought clearly and could put his ideas into such simple language that he was easy to understand. He was equally happy in speaking to general audiences possessed of little scientific knowledge and in addressing those who understood his difficulties in the solving of problems in the interests of humanity itself. They show him, too, as a great lover of his country, working not for himself but for the glory of France.

Professor Vallery-Radot concludes this last volume with a chronological table of the work done by Pasteur from 1847–1895. He adds a general index to the whole seven volumes and has compiled an "analytical and synthetic index," which is of great value for reference. It enables the reader to trace any item in the vast mass of material in which he happens to be more especially interested. Where all is good the only possible complaint is that the volume is so heavy, even in its paper covers, that it can only be read at a table or desk.

TRAINING FOR CHILDBIRTH

Training for Childbirth. From the Mother's Point of View. By Minnie Randell, S.R.N., S.C.M., T.M.M.G. (Pp. 151; 118 figures; 3 coloured plates. 7s. 6d.) London: J. and A. Churchill. 1939.

This is an attractive little book, written by a skilled masseuse, and provided with photographs of graceful young mothers doing the pre- and post-natal exercises which have been designed to prepare the muscles for parturition and to restore them afterwards. Evidence as to their success is provided by some very human diaries of experiences in labour. Psychological control, due to intelligent co-operation with the blind forces of expulsion, appears as of the greatest benefit.

The system of training is based on Dr. Kathleen Vaughan's thesis that relaxed pelvic joints and the squatting position provide the primitive mechanical ideal for labour. The woman (not to say the doctor) is taught why various positions help in the first two stages, and the reasoning is sound. Certainly the simple apparatus required—a fixed bar and a firm chair with low arms—should always be available to a patient who has the fortitude to learn and practise the appropriate movements and especially the art of full muscular relaxation. The first section of the book attempts the difficult task of describing the anatomy and physiology of pregnancy and parturition. Though the information given is clear and generally accurate, there is some loose writing here, and minor errors which could easily be corrected in a later edition. The baby, though usually "expelled," is sometimes spoken of as "wriggling through the birth canal," and as being "unhelpful." The advice about dieting to ensure a small

baby is open to criticism. Except for Figs. 3 and 6, most of the diagrams, especially the coloured ones, are very good.

The book is eminently suitable for study by any primipara of one's acquaintance, and very worthy of presentation.

Notes on Books

Professor J. W. BIGGER'S *Handbook of Bacteriology* has now appeared in its fifth edition, a fact which clearly testifies to its popularity among students. Numerous minor changes have been made in order to bring the text up to date, and a modern generic nomenclature has been introduced for the first time. The book is published by Baillière, Tindall and Cox at 12s. 6d.

Medical Jurisprudence and Toxicology, by Professor W. D. MCNALLY of the University of Chicago, provides the student of medicine with a clear and concise account of the subject. The first part deals chiefly with death by violence and describes the essential medico-legal facts regarding post-mortem examinations and related problems. One interesting feature of this section is a description of the effects produced by the Thompson submachine gun. About three-quarters of the volume is devoted to toxicology and deals not only with criminal poisoning but also with other forms of poisons such as war gases, industrial solvents, silica dust, and snake venoms. Moreover, medicinal drugs which occasionally produce toxic effects are also included. The author has had an extensive personal experience of toxicology and also gives numerous references to recent literature. His book will be found useful not only to students but also as a work of reference for qualified practitioners. It is published by W. B. Saunders and the price in this country is 17s.

Les Enfants et les Jeunes Gens Anormaux: Assistance, Hygiène, Éducation, by P. NOBÉCOURT and L. BABONNEIX (Paris: Masson et Cie, 70 fr.), is a survey of abnormalities of childhood both from the psychic and physical points of view. Dr. Babonneix has taken charge of the psychological section, and contributes a large number of papers in collaboration with Drs. Levent and Sigwald on aetiology and general prophylaxis, with Dr. Fay on intellectual deficiency and backwardness, with Dr. Michaux on character abnormalities, and with Dr. Dublineau on delinquency. Drs. Nobécourt and Levent deal with those handicapped by motor disorders, blindness, deafness, and deformities, with two short final chapters on disorders of the heart and of respiration. The purpose of this book is social rather than clinical or therapeutic; it is really a survey of those classes of children who for one reason or another need care and protection and a discussion of what is done for them in France and elsewhere. For this reason much stress is laid on the aetiology and pathogenesis of the various conditions described, and a discussion of the various legal enactments under which they can be dealt with. This book will be of special interest and use to those concerned with the social and legal aspects of medicine.

In view of the unique part which the guinea-pig has played, and still plays, in the development of our knowledge of tuberculosis and in the diagnosis of the disease in man, it is surprising that no one (to the reviewer's knowledge) had up to the present devoted a special monograph to tuberculosis in this animal. Dr. JEAN PARAF in *La Tuberculose du Cobaye* (Paris: Masson et Cie, 30 fr.) in remedying this need has done his job well. Professor Bezançon does not exaggerate in describing the book in the preface as "a work altogether original, at the same time of great practical interest and of high scientific value." In spite of the highly technical form of the subject Dr. Paraf holds the reader's interest from the moment he introduces the subject by telling us that the guinea-pig originates from South America, from where it was introduced in Europe during the sixteenth century by the Dutch. Of particular importance will be found the chapters on the "upbringing" and physiology of the animal, on its supervision, on spontaneous diseases (including pseudo-tuberculosis and spontaneous tuberculosis), and on the effects of varying the method of inoculation and the type, dosage, and virulence of organism. Preventive vaccination against tuberculosis is not omitted. This book should be translated into English.

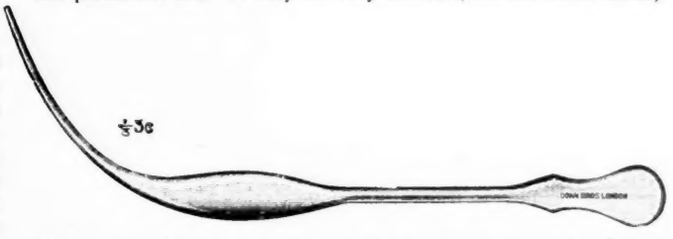
There is plenty of evidence from various parts of the world for a widespread belief that venereal disease can be cured by intercourse with a child. Mr. NIGEL MORLAND, in a pamphlet entitled *Crime against Children* (Cassell, 1s.), sets out some of the grounds on which he considers that this belief is the basis of a large proportion of sexual assaults upon children. His accounts of his interviews with prisoners convicted of child rape are particularly interesting. He makes out a good case for the close study of this dreadful superstition as a means of preventing this class of crimes.

Preparations and Appliances

A SIMPLE INSTRUMENT FOR ARTIFICIAL RUPTURE OF MEMBRANES

Dr. BRYAN WILLIAMS, F.R.C.S.Ed., M.R.C.O.G., writes:

Artificial rupture of the membranes is a common and valuable operation in obstetrics. It is now widely used as a method of inducing labour, and it has also many indications during labour. The operation may be very easy or very difficult. It is usually easy if the cervix is taken up and more or less dilated, the presenting part easily reached and pushed down, the membranes fragile, the vagina roomy, and the perineum lax. It may be very difficult, on the other hand,



if these conditions are absent. In the easy cases the finger or any simple instrument, such as a pair of artery forceps or a catheter stylet, usually suffices. In the more difficult cases we require an instrument that is rigid, sufficiently curved to allow the end to lie in the cervical canal in the axis of the cervix, and sharp enough to tear through tough membranes.

The simple instrument illustrated here fulfils these needs. After careful vaginal examination and with all possible precautions, the tip is passed into the cervical canal under the guidance of one or two fingers of the right hand. The presenting part is then pushed down externally by the left hand or by the hand of an assistant, in order to make the membranes tense, and they can then usually be torn through by slight movement of the instrument. Anaesthesia is rarely necessary.

More elaborate instruments have been described, such as that of Drew Smythe, which aims at a high rupture of the membranes. I have not found evidence, however, that the actual site of rupture of the membranes in any way affects the time of onset or the course of labour. Theoretically there is an increased risk of sepsis when an instrument is passed into the cervix through the vagina by touch, rather than by direct vision, but I believe that this risk is slight, and that it is outweighed by the relative ease and certainty of this method. I have now used this instrument in many cases for over three years with success. There have been no complications from its use, nor has any foetus been injured.

THE BRITISH ASSOCIATION AT DUNDEE

The 1939 meeting of the British Association for the Advancement of Science was held at Dundee on August 30 until September 1, when it was decided, in view of the international situation, to cancel the remainder of the meeting, which was to have continued until September 6. The president, Sir Albert C. Seward, gave an address on "The Western Isles through the Mists of Ages." The new Division for the Social and International Relations of Science held two discussions; at the first Dr. JULIAN HUXLEY presented an interim report on the organization of research in Great Britain; this was followed by a discussion of population problems opened by Professor A. M. CARR-SAUNDERS. It was announced that as from October, 1939, the reports of the British Association would be published quarterly under the title of *The Advancement of Science*, the collection of presidential addresses hitherto issued under this title having been discontinued.

Physical Anthropology

In his presidential address to this Section Professor W. E. LE GROS CLARK reviewed the present position in the study of the origin of man, of his differentiation into races or ethnic groups, and of his potentialities for the future. Parallelism had proved a difficult complication in the study of evolutionary relations, but in the case of the relation of man to the higher anthropoid apes it was clear that the human race had avoided such aberrant specializations as hypertrophy of the upper limbs, which were found in the anthropoids, and had retained a more primitive and generalized physical structure. It thus appeared probable that the human phylum must have diverged from the line of evolution leading to the anthropoid apes at a point in geological time when these arboreal specializations were yet undeveloped. Many of the man-like characters of the gorilla (such as the large and well-convoluted brain, and many details of the skeleton) were parallel developments related to the increase in body size and to the inheritance from some common distant ancestor of a common potentiality for evolutionary development along similar lines. He thought that the higher primates showed signs of a community of origin at some phase in their evolution, but that many of the resemblances shown by different genera were the result of evolutionary parallelism. In view of the scarcity of skeletal evidence bearing on the evolution of man, few inferences could be definitely drawn, but it was probable that the structure and form of the mandible gave no real indication regarding the power of articulate speech, that the asymmetry of the skull was not related to right- or left-handedness, and that it was not possible to assess the intelligence of a normal human individual by reference to the cranial capacity.

While there was general agreement among anthropologists on the defining of the primary races, the classification of the secondary races had no clear-cut basis. Statistical surveys of characters such as hair and eye colour, head shape, and blood grouping had demonstrated that their distribution bore no relation to political boundaries. Physical anthropology in the future should prosecute research by the study of living populations, and the physical anthropologist must be primarily a field worker, studying problems of human genetics, the relation of physical characters to the environment, the study of growth processes, and the study of comparative racial physiology. Thus would gradually be accumulated data on the basis of which it would be possible in some measure to control the destiny of mankind in the future.

Perspectives in Evolution

Professor JAMES RITCHIE, president of the Section of Zoology, reviewed speculations on the nature of life and the quality of life. In view of the stability of living organisms it was clear, he said, that evolution must be regarded as a process of extreme slowness. He concluded his address with a reference to the advent of man and the influence exerted by man on evolution, and looked ahead to future progress along the lines of individual development. He added that evolution in the past had been built upon destruction, and that, therefore, no impending doom for civilization need be feared from the present disturbed international conditions. Man was only a stage in life's progress—a milestone upon the path of evolution towards a greater future.

Assessment of Physical Fitness

For the Section of Physiology the president, Professor DAVID BURNS, had prepared an address on this subject, saying that in this age of complex problems few were so difficult as that of assessing fitness in an individual person or in the nation. The study of comparative death rates was of some use in judging the fitness of a community. Thus it had been recorded that the men in the only areas where the average reproduction rate was adequate to maintain the population were not on the whole as fit as in the rest of South-East England, as indicated by the excessive rejections of recruits to the Army from these areas, and from figures given by the Ministry of Labour. Physical fitness was a term of many meanings, and its definition was difficult, but he thought that the qualities of the "fit," as given by Cathcart and others, involved the whole man—an entity of extreme complexity acting in relation to a changing environment—and rendered the task of assessing "fitness" well-nigh impossible. He then proceeded to examine the validity of certain tests of fitness, and said that in his opinion physical training *per se* had been overdone. Fitness tests based on the body configuration had been disappointing; chest circumference was no measure of vital capacity, and had no relation to the state of general health; Fourmentier's thoracic index was of little value as a measure of robustness, but this index was improvable by suitable exercises. Of physiological tests, the measurement of vital capacity had no real significance. The value of deep breathing exercises lay in their effect on the filling of the heart and so on the maintenance of cardiac efficiency. Breath-holding tests measured the alkali reserve of the blood and the determination of the subject not to give in. It had been shown that the alkali reserve of fit persons could deal with all or most of the acid released by muscular exercise. It was interesting that about 50 per cent. of trained athletes exhibited mild alkalosis and might have Chvostek's sign of incipient tetany. As to the value of dynamometers, Professor Burns asked whether muscular strength plus determination could be regarded as an adequate measure of general fitness. Tests based on cardiac and vascular efficiency were of greater importance, but Turner's test, which depended on the cardiovascular reactions while standing quite still for fifteen minutes, though it had a coefficient of reliability of over 0.9 for adults, yielded anomalous results with boys. The danger in the employment of tests of recuperative power, such as repayment of the "oxygen debt," was the possibility of overstrain. The testing of muscle tone was of greater value. Psychological tests were also important, and the "stunt" tests of Cathcart had been shown to have a coefficient of validity of over 0.8. Professor Burns concluded with a reference to the effect of exercise in maintaining fitness, and suggested that norms for age and sex should be established. The recent Military Service Act had provided the opportunity for an audit of the nation's young manhood, and suitable tests should be applied by properly trained examiners.

BLOOD TRANSFUSION

The National Emergency Blood Transfusion Service announces that registered blood donors in London and Greater London will be notified when they are required, and until then they need take no action. They will be notified by letter, by message conveyed through Scouts or the Boys' Brigade, through the Press, by radio, or other means, and will be told when and where to attend. Donors having group "O" blood will be called upon first for blood to be stored for national use.

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WAR AND THE MEDICAL PROFESSION

Three hundred years ago Spinoza wrote: "A free man never acts by fraud, but always with good faith." The successive fraudulent acts of Hitler that have ended in the present tragic fraud he has practised upon the German people shows that he is not a free man. Spinoza, a Jew, would also seem to explain why the German Führer is not free, when he wrote . . . "A man who is submissive to his emotions is not in power over himself, but in the hands of fortune to such an extent that he is often constrained, although he may see what is better for him, to follow what is worse." Lamentably, Hitler has imposed his own servitude on his own people. War as an aspect of human society concerns medical men as "field workers" in human biology, and many, no doubt, would like to add a rider to the reported statement of an eminent biologist last week at Dundee that "evolution in the past had been built upon destruction, and that, therefore, no impending doom for civilization need be feared from the present disturbed international conditions." We may add the rider in the words of another biologist, Dr. Julian Huxley: "Competition and co-operation both occur throughout the whole of evolution: but co-operation comes to play an ever more considerable part in higher forms." In addition to the vital and essential part the medical man has to play in war—in the prevention and control of infection and in the treatment of injuries—he is, by virtue of his profession, at a unique vantage-point for preventing the disintegrating emotions of hate, fear, panic, and vengeance, which stultify co-operation and lead to atavism. Modern psychology gives him the key to the understanding of "hypothalamic behaviour." And the British doctor has this advantage over his German colleague—he works among a free people; upon the co-operation of free people the progressive evolution of the human race will depend.

The outbreak of war twenty-five years ago found the civilian medical profession willing and anxious to play its part, but without any organization prepared in advance for classifying its members, for distributing them to various branches of national service, or for safeguarding their interests. To-day, thanks to the foresight of the British Medical Association, the profession is fully organized against emergency in these and other respects. Profiting by the experience it had gained in 1914–18 the Association co-operated with the Government many months ago and drew up a classified index of medical practitioners for use in time of war, and this voluntary national register has been kept continually up to date. The Central Emergency Committee, appointed by the Association at the behest of the Ministry of Health, has been in liaison with a network of Local Emergency Committees throughout the country since the crisis of 1938. Its primary function is to advise the Government on the allocation and distribution of medical personnel—the supply of medical manpower in war both for the armed Forces and for meeting civilian requirements. Among its many secondary duties has been the drawing up of schemes for protection of the practices of absentee doctors, both general practitioners and consultants and specialists. Everything has been done in close co-operation with the local committees. In recent months the work intensified in readiness for the calamity of European war. The civilian profession, through the B.M.A., is mobilized. At least 150,000 beds are already available for casualties in England and Wales, following the evacuation of hospital patients from London and other large cities. Some 24,000 stretcher cases have been moved, including over 3,000 from the county of London. Medical students have been active in evacuating patients and in completing the defence arrangements of their hospitals.

In September, 1938, plans which had been maturing at headquarters for two years were brought into action. The full load of war-time stress was not experienced then, but enough demands on the special emergency machinery at Tavistock Square were made to prove that it could work efficiently under war conditions. Since then everything has been done to perfect and safeguard it against any forseeable contingency. It was recognized by those responsible that the medical profession must remain prepared and that for this purpose the War Emergency Register must be kept up to date in every detail. An account of how the central staff rose to the occasion, ably assisted by two hundred local emergency officers, appeared in our *Supplement* on October 8 under the heading "The Problem of Medical Mobilization."

So much for the past; and in times like these the past is only of importance as a guide for the present and the future. The position now is that the Central and Local Emergency (War) Committees set up by the British Medical Association are responsible to the Government for the supply of medical personnel for the fighting Forces and

for the civilian population. The allocation of practitioners for duty at first-aid posts was complete some time ago, and the appointment of practitioners to the Civilian Hospital Service, Classes A and B, is practically complete. Demands for medical personnel for the Services come from the Department or Service concerned direct to the Central Committee, which allocates a quota of the demand to each local committee, having regard, among other things, to the movements of the civil population. The local committees will keep in touch with practitioners who have intimated their willingness to undertake national work of one kind or another but have not yet been allocated; also with practitioners in an evacuation area who as a result of evacuation are unemployed and are willing to work in a reception area. Local committees now possess ready for distribution to doctors in their areas a supply of books for use in certifying war injuries, and also of documents from the Ministry of Health explaining procedure for free medical certification in connexion with payment of injury allowances, and from the Registrar-General on methods of death certification in respect of civilians killed by enemy action. The Association has agreed with the Ministry of Health the terms of payment for medical treatment of children evacuated to reception areas under the Government's scheme; an announcement on this subject was printed in last week's *Supplement* with other matter concerning the emergency. Further notices to the profession from the Central Committee, and other information, will appear there week by week as occasion requires.

INDUSTRIAL HEALTH AND WELFARE

The annual report of the Chief Inspector of Factories for 1938[1] is of more than usual interest, for it describes in some detail the various effects produced by the operation of the new Factories Act, 1937, with its numerous changes from previous Acts. The Act did not come into force until July 1, 1938, but most firms had previously made arrangements for complying with it by modifying, when necessary, the hours of work of their employees and by altering the machines and premises so as to conform to the new safety and welfare requirements. The working of the Act inevitably threw much extra strain on the factory inspectors, in spite of their numbers having increased to 307, or 100 more than in 1928. The subject of accident prevention was tackled by the inspectorate even more vigorously than in previous years, with the welcome result that there was a decrease of 6 to 7 per cent. in the number of reportable accidents in all places, and one of 10 to 12 per cent. in the manufacturing industries. The inspectors report that more real progress has been made during six months in the elimination of dangerous conditions than for many years past. The number of safety committees has been increased by 200 in the past year (a rise of 16 per cent.), and the value of safety work—based on the system of the National Safety First Association—is shown by the fact that in several factories the accident rate has been reduced to a half or a third in the course of a few years. Accidents to young workers have received special attention from the inspectors, for the frequency of such accidents is greater than among adults. Some of the managers were surprised to find that the smartest and most intelligent youths were specially liable to incur accidents, but this was chiefly due to their curiosity in exploring ideas of their own. As one of the sufferers admitted, he wanted "to see the wheels go round." Under the new Act young persons are not permitted to work at certain machines unless they have been fully instructed as to the dangers arising and the precautions to be observed, and have received enough training under adequate supervision. Unfortunately, training in machine risks is insufficient to guard against injury, for the majority of the accidents incurred have nothing to do with machinery. A few firms train their young workers in factory conditions by sending them round sections of the factories on various occasions with an instructor, who points out the dangers of the operations being performed, but, as the Chief Inspector regretfully adds, with most firms the safety and general care of the new entrant are still a minor matter compared with the question of production.

In the section of the report dealing with health the senior medical inspector, Dr. J. C. Bridge, states that a willingness to comply with the new requirements of the Act has been experienced in general, even in respect of difficult requirements such as the stricter standard against overcrowding and the disuse of underground workrooms. A gradual reduction in the number of cases of industrial poisoning and disease continues, and it is gratifying to note that lead poisoning cases are now not a tenth as numerous as they were in 1900. The reduction of lead poisoning in the pottery industry is specially marked, owing mainly to the substitution of a low solubility glaze for raw lead glaze. Cases of epitheliomatous ulceration are still very numerous, especially in men engaged in tar distilling, but owing to the adoption of periodic medical examination cases are now notified at an earlier stage of the disease, and the widespread adoption of ray treatment reaches many cases which have

[1] Cmd. 6081. H.M. Stationery Office. (2s.)

not yet assumed malignancy. A new and valuable approach to the prevention of epitheliomatous ulceration in cotton mule spinners has been made by one large firm. Instead of the usual wasteful and clumsy method of oiling, the spindles are now lubricated by contact with a pad to which oil has been applied. Thereby splashing of the workers' overalls is reduced to such an extent that they are practically free from oil after a full week's work. It seems probable that if this or a similar plan were adopted by other firms mule-spinners' cancer would in time be eliminated. Cases of gassing still number about 200 a year, and it is sad to find that a number of the fatal cases were due to the lack of precautions on the part of would-be rescuers. For instance, five of the nine fatal cases of poisoning by the carbon monoxide of blast furnace gas occurred during attempted rescue, and three of the five fatalities from sulphuretted hydrogen poisoning in the sludge pit of a tannery likewise occurred to rescuers. The deaths from silicosis continue to rise slowly, and in 1938 numbered no less than 430; but it is encouraging to note that in several industries harmless materials are gradually being substituted for the deadly silica-containing materials. For instance, alumina is being substituted for the dangerous flint used in embedding china articles (for firing).

Welfare is receiving a valuable stimulus from the new Act. Under the old Act washing facilities, accommodation for clothing, and facilities for sitting were, with minor exceptions, compulsory only in certain dangerous trades. These requirements are now compulsory in all factories, and the widening of the field of welfare is raising the standard of comfort of workers throughout industry.

A SUCCESSFUL EXODUS

Mr. Herbert Morrison, leader of the London County Council, assembled a number of journalists at County Hall on September 4 to rejoice with him on the completion that day of the evacuation from London of some 650,000 persons—about the same number, by the way, as the children of Israel, who made a much more leisurely though less comfortable exodus from Egypt. The evacuation, which was from the L.C.C. area and contiguous boroughs, occupied four days. Mr. Morrison pointed out that these large numbers consisted not of able adults, but of school children, pre-school children, expectant mothers, and the blind. A population larger than that of Sheffield or Leeds has been distributed over the country south of a line drawn from the Wash to Cornwall. The whole procedure has taken place smoothly, expeditiously, and without a single casualty. In addition 5,000 patients from the Council's hospitals, including 1,500 children (none of whom are suffering from infectious diseases), have been transferred, mostly to towns fifty or sixty miles from London. The blind and those of the expectant mothers who were near the time of their confinement were taken away by coach; others travelled by railway after a short journey by bus or tube to their entraining point. Mr. Morrison bore testimony to the excellent bearing and behaviour of these thousands of, principally juvenile, Londoners. It was difficult, he said, to imagine more trying circumstances for such a journey, and yet all went well, and the Council's organization was thus enabled at a most critical time to carry through an important contribution to national preparedness. Indeed, the organization was framed to cope with even larger numbers, for many parents who registered their children to be evacuated did not when the time came make application. Not one who applied was refused. The Council, said Mr. Morrison, was the agent of the Government in organizing the London end of the evacuation scheme, the Government being responsible for the general policy. The responsibility of the Council ended with the entrainment of those taking part, and the arrangements in the reception areas rested with the authorities in those areas. The finest piece of organization of all, in Mr. Morrison's opinion, was the transfer of 17,000 physically and mentally defective children and toddlers, for whom special accommodation was found in country houses. He paid generous tribute to the untiring assistance of many different organizations at the London end and of thousands of public-spirited men and women. Foremost among these he placed the officials of the London Passenger Transport Board and of the main line railway companies, who "treated the children as first-class passengers, but collected no tips." The police as usual gave effective but unobtrusive help, the St. John Ambulance Brigade stood by, and with the parties went nearly all the Council's teaching staff and upwards of 20,000 voluntary helpers, men and women, who offered freely of their time and services to assist in looking after the evacuees. Such organizations as the Salvation Army and some of the big business firms contributed quotas of helpers. The parties of expectant mothers were accompanied by midwives holding the certificate of the Central Midwives Board, most of whom were in the service of the Council. Many owner-drivers of private cars volunteered to assist in picking up stragglers, so that the last became first, and the unpunctual sometimes received what they did not deserve, a specially comfortable trip right into the reception area. Finally, Mr. Morrison congratulated Mr. Charles Robertson, chairman of the Education Committee of the Council, and the Council's own staff, on the genius which had inspired the scheme and piloted it through with such outstanding success. From all we hear the evacuation from other city areas was also effectively completed, and the largest transfer of population in the history of this kingdom has been carried through in a manner which reflects credit on all concerned. There remains to be told, when the time comes, the story of how well the reception areas have risen to their opportunity.

POSITIVE-PRESSURE RESPIRATION

The use of apparatus for increasing the pressure in the pulmonary air passages slightly above that of the atmosphere in the treatment of acute pulmonary oedema of circulatory origin was first suggested by Plesch,[1] and a practical apparatus for this purpose—the "pulmonary plus pressure machine"—has been evolved by Poulton.[2] Plesch took the view originally put forward by Welch,[3] that in pulmonary oedema disproportion between the working power of the left and right ventricles is such that the left heart is unable to pass on all the blood reaching it from the right heart, thus causing a rise in pulmonary capillary pressure. He considered that the effect of increasing the pressure inside the air passages would be to help to push blood out of the pulmonary circuit, and that the rattling respiration observed in acute pulmonary oedema, consisting of short inspiratory gasps and prolonged forced expirations through a contracted glottis, was a compensatory mechanism which increased the mean intrabronchial pressure. Poulton's "plus-pressure" apparatus was originally introduced for the treatment of acute pulmonary oedema of circulatory origin, and later used also in the treatment of paroxysmal nocturnal cardiac dyspnoea—the so-called cardiac "asthma." It is generally agreed that these attacks have a similar pathogenesis to that of acute pulmonary oedema of circulatory origin, representing, in fact, a mild attack of the same nature. Favourable results in both these sorts of attacks were reported by Poulton. Barach, Martin and Eckman[4] in an experimental study produced acute pulmonary oedema in rabbits by intravenous injection of large doses of adrenaline. If the animals did not die during the initial period of apnoea they developed acute pulmonary oedema within two to five minutes. Radiologically it was found that the heart shadow was greatly increased and the lung fields became less "radiolucent," indicating pulmonary congestion, and at necropsy the cardiac enlargement was found to be due to dilatation of the right auricle and ventricle. Both the pulmonary oedema and the enlargement of the heart could be abolished by increasing the intratracheal pressure above atmospheric by 4 cm. of water during inspiration and 6 cm. during expiration. They found no significant change in the mean intrapleural pressure during the acute pulmonary oedema produced by adrenaline. Application of positive-pressure respiration caused only slight changes in the systemic venous pressure in adrenaline-treated animals. From their experiments they concluded that positive-pressure respiration was of value in pulmonary oedema because, among other factors, it both diminished the volume of blood entering the right heart and exerted an opposing force to the increased pulmonary capillary pressure. In an investigation of positive-pressure respiration in ten normal human subjects the only constant findings were a slight increase in the venous pressure and the circulation time, and a diminution in the vital capacity, probably due to an increase in the residual air. Comparing these results with those obtained in fourteen patients with congestive heart failure, Barach and his colleagues observed that the increases in the venous pressure and circulation time were greater in the cardiac group; and in six out of seven cardiac patients breathing under 6 cm. positive pressure there was an actual rise in the vital capacity. An isolated observation in a case of "neuro-circulatory asthenia" suggests a possibly fruitful line of investigation in these difficult "functional" disorders of the heart; in this case, without evidence of organic heart disease, breathing against 2 cm. water pressure caused a rise of 3 cm. water in the venous pressure. The clinical application of positive-pressure respiration in eight cases of oedema of the lungs suggested that rapid clearance of oedema could be expected in most cases of circulatory origin, though in several the effect was only transient. When oedema was due to inflammation positive pressure was, as would be expected, less helpful; it seems doubtful, therefore, whether this measure would be of any value in the treatment of the acute pulmonary oedema caused by gases irritant to the lung, such as mustard or phosgene. The acute pulmonary oedema of circulatory origin and "cardiac asthma" seem to involve a vicious circle, which in practice is usually most promptly and efficaciously treated by the administration of morphine. Far more extensive clinical data on the use of positive-pressure respiration apparatus in these cases are needed before a reasoned estimate of their efficacy in breaking this vicious circle can be made.

[1] *Z. klin. Med.*, 1933, **123**, 208.
[2] *Lancet*, 1936, **2**, 981.
[3] *Virchows Arch.*, 1878, **72**, 375.
[4] *Ann. intern. Med.*, 1938, **12**, 754.

HEALTH ADMINISTRATION

All the publications of P E P (Political and Economic Planning) are important. Those dealing with health and administration are very valuable—almost essential—to persons interested in social medicine and welfare. A recent "planning" broadsheet concerned with "sorting out the confusion" in "the control of health services" is one of these. It is a kind of addendum to the comprehensive report on the British Health Services issued in December, 1937, and to the popular summary of that report now available in the form of a sixpenny "Pelican Special" entitled *Britain's Health*. This broadsheet is particularly opportune to members of the British Medical Association because a special committee of the Council has been set up to consider financial and administrative questions arising out of the scheme for a General Medical Service for the Nation and the criticisms to which it has given rise in these respects, and because the Representative Body has asked the Council to pursue these inquiries in relation to certain specific suggestions. As the broadsheet says, "Dissatisfaction with the present system of administering the public health services is expressed in every quarter, but there is no definite agreement about the desirable remedies." That wider administrative units than the present local government areas are required for at least some health purposes—especially for hospitals and for consultant and specialist services—is now generally admitted, but such regional adminis-

tration is difficult to establish without more good will or more ruthless enforcement than is at present manifest. Despite the existence of facilities for co-operation comparatively little use has been made of them, and in a number of cases in which local authorities have made agreements terminable at short notice the arrangements often do not work very satisfactorily. In regard to the public health services, councils for all practical purposes are able to do exactly as they like since the Ministry of Health does not exercise its powers of coercion. Most county councils even have done little or nothing towards the rearrangement or amalgamation of county districts because any attempt in this direction would give rise to local jealousies and indignation. Perhaps the regional schemes necessitated by A.R.P. and war-time administration and the obvious requirements of the Cancer Act may lead to a newer outlook and stronger action in these directions. For a rational consideration of these questions and others of a cognate character nothing could be more convenient than this P E P broadsheet. It assembles with great accuracy and clearness the facts of the present position in relation both to England and Wales on the one hand and to Scotland on the other, where administrative conditions are not quite the same. It enumerates a number of suggestions that have been made, and it clarifies to a large extent the nature of the problems that have to be solved. It should be of great help particularly to members of the B.M.A. Council, of the Representative Body, and of the Association in general in the formulation of opinion which is necessary during the coming year.

ALTERATIONS IN THE JOURNAL

To meet the conditions imposed by a state of war initial changes have been made in this week's issue. We regret that it has been necessary to cease printing the Key to Current Medical Literature. Apart from the economy of space that has to be effected, abstracters will be engaged in war duties and many of the periodicals that have been listed in the Key will no longer be available. The second most obvious change is the incorporation of the *Supplement* at the end of the *Journal* to facilitate printing and to economize in labour and costs. The *Supplement* will no longer appear as a separate inset, but we would here emphasize its great and increased significance to all members of the profession, for in it will be published, for the most part, important official instructions and information from the Central Emergency Committee of the British Medical Association and the Ministry of Health. Readers are therefore urged to read the *Supplement* each week and keep it for reference. It is probable that as time goes on increasing economy of space will have to be made, and contributors are therefore asked to be sparing of their words. To vary an old saying, brevity is the soul of clearness. Members are asked to be prompt in notifying changes of address so that there may be as little delay as possible in the receipt of the *Journal*, which will continue to be published from Tavistock Square.

SILVER JUBILEE OF THE MEDICAL JOURNAL OF AUSTRALIA

In warmly congratulating the *Medical Journal of Australia* on reaching its twenty-fifth year, attention should be directed to the special number, dated July 1, 1939, which fitly celebrates this event by a number of authoritative articles of retrospect. The first of these, by Dr. J. H. L. Cumpston, Director-General of Health, is a contribution to a developing branch of the history of medicine, that of medical journalism, which will be extremely welcome to those who previously may have felt somewhat confused by the titles of the ten medical journals published in Australia, the first of which, the *Australian Medical Journal*, appeared in 1864 and expired after fifteen monthly issues; the second began in 1854 and, with changes of name and of times of appearance, survived until 1914. Sir Charles Blackburn, President of the Royal Australasian College of Physicians, sketches the changes in medicine during the last quarter of a century, and is followed by Sir Henry Newland, a former President of the Royal Australasian College of Surgeons, with a review of surgical advances. The facts of preventive medicine in Australia during the last twenty-five years are set out by Dr. F. S. Hone, who with wise caution responds to the Editor's invitation to express prophetic opinions. Professor C. H. Kellaway gives a wide summary of progress in medical research during the same period, and Dr. F. M. Burnet of the Walter and Eliza Hall Institute, Melbourne, describes the changes in the outlook on infective disease. Later in the Silver Jubilee number, as a footnote to the first historical article, there is an account of the Australasian Medical Publishing Company. An attractive leading article, "Looking Backward and Looking Forward," is presumably by the talented Editor, Dr. Mervyn Archdall, whose name has been modestly excluded from this milestone, where it would naturally appear, but he may justifiably feel proud of its success.

The appointment of Sir Thomas Dunhill, K.C.V.O., consulting surgeon to St. Bartholomew's Hospital, to be Sergeant-Surgeon to the King in the room of Mr. Wilfred Trotter, F.R.S., F.R.C.S., resigned, is announced in the *London Gazette*. Sir Thomas Dunhill has held successively the post of Surgeon to the Royal Household, Honorary Surgeon to the King, and Surgeon to the King. The appointment is also announced of Mr. George Gordon Bruce, F.R.C.S., of Aberdeen, to be a Surgeon to His Majesty in Scotland.

In pursuance of an Order made under the Defence Regulations, the Minister of Supply has undertaken the control of supplies and prices of molasses and industrial alcohol, and of substances which are normally produced from molasses or industrial alcohol, including acetone, acetic acid, butyl alcohol, amyl acetate, butyl acetate, ethyl acetate, and fusel oil. Such control will be exercised by a Department of the Ministry entitled the Molasses and Industrial Alcohol Control.

WAR WOUNDS AND AIR RAID CASUALTIES

The following article is a supplement to the series of lectures on war wounds and air raid casualties printed in these columns

PSYCHOLOGICAL EMERGENCIES IN WAR TIME

BY

MAURICE B. WRIGHT, M.D.

In any war with modern weapons of destruction, psychological emergencies, or, as they are more often called, psychiatric casualties, will be much the same in character, although the proportion of the different types of casualty may vary. During and after the great war many books were written describing the different types of psychiatric casualties both in this and in other countries. After twenty years much of this literature has fallen into oblivion, and a generation of medical men has arisen to whom war neurosis and psychiatric casualties are largely unknown. It is only the recent political situation, with the ever-present threat of war, that has brought the whole subject out of the oblivion into which it was gradually dropping. It is recognized by all thinking men and women, medical or lay, that the psychiatric casualties in the present war, of the character we are told we must envisage, may have even more far-reaching effects than physical casualties, loss of life, or material destruction. It is a problem that everyone, at any rate in our large towns, is having to face—not so much, "Shall I be killed or injured?" but "Can I face it; shall I break down; shall I keep sane or normal under the conditions I may have to endure?" There can be no question that many, perhaps most, of us cannot feel quite sure of the answer.

I think it is impossible to estimate with any certainty the number of psychiatric casualties that will have to be dealt with if any civilian population is exposed to frequent and intense aerial bombardment. During the great war psychiatric casualties occurred among disciplined troops, mainly young and to some extent at any rate selected, all of them subjected to a training which would make for the raising of morale and obedience to orders. War directed against a civilian population exempts no one, excludes no one. The morale of a civilian population is impossible to assess beforehand; it will depend on many factors—to a certain extent on class, to a greater extent on the density of the population exposed, and probably to the greatest extent on the adequacy of the protective measures and the confidence these measures inspire. The civilian population must be treated as if they were combatant troops; they must be under authority and know what to do and what to avoid doing in case of emergency. The authority also must not be remote, but, like a battalion commander, be personally known and accepted before the emergency arises.

The following attempt to classify psychiatric casualties is based on experience during the last war, both personal and communicated. Like all classifications, it must be to some extent arbitrary; types will not always be clear-cut, and exact diagnosis will often only be possible long after the case has left the casualty clearing station for special psychiatric hospitals. The classification attempts to represent the various forms of psychiatric casualties which may be admitted to first-aid posts and casualty clearing stations, and is not meant for the skilled psychiatrist, whose services may very often not be available. It will probably be useful to try to divide the admissions into the following groups: cases of simple terror; anxiety hysteria: conversion hysteria, including hysterical stupor; concussion; and psychoses.

Simple Terror

It must always be remembered that terror is not in itself pathological; it is a normal biological response to stimuli which are felt, rightly or wrongly, to be a threat to life or are entirely foreign to all previous experience. It is, as a rule, a short-lived reaction, and passes quickly, either by getting into safer conditions or when the danger has passed. In cases of simple terror the instinct of self-preservation is in action, but not to such an extent that habituation to dangerous conditions is impossible; and, as the terror passes, purposive action in the interest of the group is again possible. It has been said that during a raid first-aid posts and casualty clearing stations will be filled with terror-stricken people. I think this is doubtful; most of those in a state of simple terror will stay where they are or go where they feel safer, and a great majority will overcome the terror and if they have a job to do will carry on.

How can we differentiate the real coward? The real coward is a coward always and all the time—in situations of danger the instinct of self-preservation is always uppermost; he will see to it beforehand that he can go at once to safety, and nothing will move him; he is not always overtly terrified. To quote what has often been said, "The brave man is afraid of feeling afraid; the coward is afraid of being brave."

Anxiety Hysteria

In peace time the label "anxiety hysteria" is given to by far the greatest majority of neurotic maladjustments and illnesses and includes a very great variety of psychological as well as somatic disturbances which are found to be related to anxiety, and the anxiety is in perhaps most cases conditioned not so much by external conditions as by internal conflicts. As a psychological emergency in war the anxiety hysteria will resemble the severer forms of anxiety attack seen occasionally in peace time, but will, at any rate, apparently be more definitely related to the dangerous situation, whether past, present, or anticipated.

It will be important to try to differentiate the real anxiety hysteria from the attack of simple terror. It will not always be easy, but there is one difference which, although it is not invariably true, is of fairly general application. In the anxiety hysteric the emotional response to the situation has ceased to be biological and therefore to some extent useful, but has become pathological. The instinct of self-preservation has often ceased to operate; flight, or any purposive action or effort of will to overcome the terror, has become impossible. The emotional upheaval is so great and the somatic accompaniments of fear are so intense that no amount of reassurance, or removal to a place of safety, no appeal to any ego ideal of courage, elicits any response for the time being. The individual has regressed to a more primitive level; the effect of fear on the whole autonomic system has for the

time being put out of action the higher centres of volitional control.

Severe cases of anxiety hysteria will not come themselves to the casualty clearing station or first-aid post; they will be brought there, often as stretcher cases, during raids or shortly after; they may be brought in from the streets or air raid shelters, collapsed and tremulous, or wandering in a purposeless way with clouded consciousness or even amnesia; near to any severe explosion, they may be found lying apparently unconscious in the state of hysterical coma or stupor which will be referred to later. Between raids they will be brought to hospitals by their relatives, perhaps from homes close to a bombed area or from districts quite untouched—perhaps not such severe cases as those occurring actually during a raid, but quite impossible to nurse at home. There is a constant expression of terror, a coarse tremor, sweating, and tachycardia; they scream sometimes if touched, and some lie curled up under the bedclothes in the intra-uterine position. These are the severer psychiatric casualties which will most certainly occur in bombed areas. They may recover fairly quickly from their acute symptoms under hospital conditions, but evacuation is imperative, not only for the individual but because, if these cases are sent home, they will certainly relapse and become sources of "infection" to those around them who may be themselves on the verge of breakdown. I believe it to be most important to realize that many milder cases of anxiety hysteria may need to be evacuated, not so much for the sake of the individual as for the community, who may be infected by their anxiety and themselves become less tolerant of stress.

Conversion Hysteria

It may be wise even nowadays to restate what it is that is converted in conversion hysteria. It is anxiety that is unconsciously converted into some disturbance or even complete inhibition of a somatic function. This is true, and always true, not only of war conversion hysteria when the anxiety converted is the result of terrifying external situations, but also in the conversion hysteria of peace time when the anxiety is more often of endopsychic origin. The conversion hysterias are modes of dealing with and often completely inhibiting anxiety. The hysterical pareses, mutism, asphasia, deafness, blindness—all are the result of acute anxiety, but converted into the somatic disturbances and no longer felt as such. The hysterical paraplegic, the aphasic, the deaf—all of these have ceased to be anxious about the original traumatic experience, and even any anxiety about the actual symptoms seems often non-existent. It is the same mechanism in the hysterical fugues, amnesias, and stupors, many of which may be seen as psychiatric casualties.

Much has been written about what is called the period of latency, the interval that often elapses between the initial shock or production of acute anxiety and the development of conversion symptoms. It has been called the period of subconscious elaboration, or, by some French writers, the period of rumination. From some of these writers one gets the impression that they consider that in the period of rumination there is a sort of conscious attempt to avoid the anxiety by means of conversion. I do not believe this is true, the conversion symptom is not consciously willed, and whatever happens in the latency period is carried out, not in the field of consciousness but at deeper unconscious or preconscious levels. Nothing is known definitely about what does occur or how the conversion is made; we may speculate, but certainly, in my opinion, we do not know.

Conversion hysterias are true dissociations of consciousness: the hysteric has no awareness of the function which is lost, whether it is speech or some part of memory or motility. It is perhaps related to this that so many cases of conversion hysteria in war time are initiated, sometimes suddenly, without any latency period, by any momentary loss of consciousness, such as may occur in proximity to a severe explosion or on being momentarily buried under a fall of earth or debris. There is probably no true concussion, and they do not present the symptoms of cases of true concussion. One striking fact emerged during the last war and was confirmed by all observers. By far the greatest proportion of cases of conversion hysteria occurred among the men in the ranks, comparatively few among officers. There may be many reasons for this; in my own experience the true conversion hysterias often occurred among the rather naïve, simple, not very intelligent type of soldiers—often not overtly very anxious in the firing line, obeying orders, accepting authority, but avoiding any responsibility. When they broke down they did so suddenly after only a short period of acute anxiety, or after some experience of intolerable stress. Through this conversion symptom they obtained not only relief of intolerable anxiety but sanction for removal from the danger zone, which would persist so long as the symptoms remained.

It is as if the officer, with his training, his sense of responsibility, his higher ego ideal, could and did tolerate enormous amounts of anxiety before the final breakdown, but, because of his ego ideal, could not sanction the complete flight of the conversion hysteric. The man in the ranks of the type described, with no ego ideal, no sense of responsibility to anyone but himself, had nothing to inhibit the mechanism of conversion, whatever it is, which gave him so complete an escape. These views are admittedly only superficial explanations, and many other psychological determinants which would explain the difference between the two groups would emerge during treatment.

Hysterical Stupor

There is one form of hysteria that was seen fairly often during the last war and may, I think, be seen much more frequently in a future war when the brunt of the attack may be upon human material of all and every type without any selection either for mental or physical fitness; this is hysterical stupor or coma. It is important because it is not always easy to distinguish between hysterical coma and severe concussion, and the treatment and subsequent history are entirely different. These cases will be found lying apparently deeply asleep or unconscious. I use the term "asleep" advisedly, because French writers in the past have called the state "narcolepsy," although it is entirely different from the narcolepsy of modern neurology. They will generally be found somewhere near to a bombed area, generally flaccid but with no disturbance of the deep reflexes. If an attempt is made to open the eyes it is resisted by strong contraction of the orbicularis. The eyeballs are turned strongly upwards and fixed. There is sometimes, but not always, relaxation of sphincters. They may remain like this for hours or days and then recover, often with a patchy but not complete amnesia, both anterograde and retrograde. From the nursing point of view these cases are in my personal experience often most difficult and very alarming. The patients will sometimes recover consciousness quite suddenly and become very violent and uncontrolled, attacking, or more often pretending to attack, those who come near them; then after a violent period they relapse again

into coma. The attack resembles closely the somnambulisms, often intensely dramatic and alarming, which occur very frequently among anxiety hysterics in war times when in hospital.

Other Disturbances

The conversion hysterias that have generally the most definite, and often long, latency period are the paraplegias. They will frequently occur associated with a slight wound or injury but quite unrelated to the extent or even situation of the injury. They will vary endlessly in character—complete paraplegias, disturbance of gait with or without contracture, monoplegia of the arm with *main en griffe* or accoucheur hand. There will be endless cases of coarse tremor, often resembling an intention tremor and confined to one limb, or spreading to every limb when any movement is suggested. There will be tics of all kinds and many stammerers. These last two forms are nearer akin to the anxiety hysterics, and all the anxiety will not have been converted. Another group will be the so-called psychosomatic types—cardiac neuroses, respiratory neuroses, and visceral neuroses. I have seen persistent attacks of severe orthopnoea in cases which occurred through being buried. In this last group anxiety is still felt, but has shifted from the original emotional trauma to anxiety about the function that is disturbed.

Hysterical amnesias will be fairly often seen as psychiatric casualties, and must be differentiated from post-concussion amnesias—not always very easy, especially if there is a history of proximity to a severe explosion with the possibility of a momentary true loss of consciousness. They are frequently very patchy, both retrograde and anterograde, and in the patchy amnesias there is often still some anxiety and some confusion. The man remembers nothing since, for example, he was in a training camp in England, but feels that something dreadful happened after this. Other rarer cases are complete amnesias for all the past. One patient I remember very well was exactly like a child, but with no memory of his parents or home; until he recovered he had to be taught again how to feed himself, to read, and to write. The true hysterical fugues—the cases where men are found wandering with a complete retrograde amnesia, going back either for days or months—are not, in my experience, so common. A fugue is so often the easiest form of true malingering and not always the easiest to detect. I have myself worked at a fugue case for many months in a very intelligent man of the officer class, only to find out in the end that he was a true malingerer with no loss of memory at all. Others are quite easy to detect after a little questioning, and are often associated with the end of leave. True fugues do exist, of course, but they are much easier to simulate than the patchy amnesias associated with more or less anxiety.

Concussion

Here we are on debatable ground. Cases of true concussion may be considered as neurological rather than psychological casualties; but they will certainly often be regarded as psychiatric casualties, because they will be found unconscious without any sign of physical injury. It is also debatable ground because in much of the literature on war neuroses cases are included under concussion when, although there may have been transient loss of consciousness, there are marked symptoms of anxiety hysteria, or even of conversion, immediately or shortly after the traumatic episode.

In true concussion the period of unconsciousness may be extremely short, or deep and prolonged. In the slighter forms the man may recover and carry on with what he was doing, apparently little the worse. In all cases, however, of true concussion I believe there is one significant feature—a retrograde amnesia which, short or long, is always clear-cut and definite, and an amnesia which is permanent; there may also be a varying anterograde amnesia, not so clear-cut as it emerges into full consciousness, but also permanent. Concussion patients as they recover may be confused often for a long period, but there is not the same amount of anxiety as in the hysterical cases; the complete retrograde amnesia has also cut out all recollection of any anxiety or emotion felt just before the traumatic incident. All the concussion cases are, in my experience, more serious than the anxiety hysterics; in severe cases the ultimate prognosis is very uncertain, and some deteriorate into a permanent condition of mental hebetude and depression. A severe case of concussion brought in unconscious should be fairly easily differentiated from hysterical stupor. The patient is profoundly unconscious, deep reflexes are abolished, muscles are hypotonic, pupils are often unequal, and there may be ophthalmoplegia or ptosis.

The Psychoses

In any civilian population there are a fairly large number of psychopathic personalities, mild manic-depressives, schizophrenics in remission, and superior mental defectives. All of these will stand the strain of war conditions badly and will become psychiatric casualties. In the last war cases of katatonic stupor were found in casualty clearing stations; mildly depressed men became acutely maniacal; cases of mild hypomania became acutely depressed. The problem of the effect of war on high-grade defectives is in war time often more a social than a medical problem. In the last war some of this type managed or were compelled to enlist, even obtained commissions. Many drifted into military prisons or were sent into special hospitals for observation and report for various delinquencies, character disorders, or anti-social acts. There will probably be more of these in any war on civilian populations.

I have said nothing about the effect of war conditions on the obsessional neurotic, of whom there are very many. I have done this deliberately because, in my opinion, the true obsessional stands war conditions as well as or better than most; when he does break down he will become for the time being an acute hysteric with similar symptoms. It will only be when under treatment that the obsessional character will again emerge and present a definite problem.

Neither have I said anything about the more specific effects on women and children; here much could be written, but it must be, and I hope may remain, speculative.

I have given a classification in which any psychiatrist, including myself, could pick as many holes as are in a sieve. I have only attempted one which may have some practical value.

A revised edition of the pamphlet *Physical Aspects of Radium and Radon Therapy*, by Dr. C. E. Eddy and Mr. T. H. Oddie of Melbourne, has been issued by the Health Department of the Australian Commonwealth, Canberra. Copies are being distributed to radiologists and physicists in Australia to assist in attaining accuracy and careful application of radium and radon in treatment, and to foster co-operation between radiologists and physicists. The first edition was noted with approval in our issue of September 18, 1937 (p. 589).

Correspondence

Treatment of Traumatic Wounds and Open Fractures

SIR,—That the treatment of traumatic wounds and open fractures is arousing great interest at the present time is evidenced by perusal of the current numbers of the *Lancet* and the *British Medical Journal*. The special articles on war and air raid casualties which have been appearing in your pages have been most instructive and greatly appreciated. A series of lectures upon this subject delivered to the medical profession of this district in July, under the auspices of the British Medical Association, was attended by packed audiences of practitioners and surgeons. My object in writing to you is to submit that the best Continental practice, as influenced by the paramount authority of Böhler, has revealed to many that the system and methods advocated must furnish an entirely new conception of the subject of wounds and fractures. Evidence is not lacking that in not a few quarters in this country advantage is being taken of this new knowledge to improve the treatment of patients. If the report of the Interdepartmental Committee on the Rehabilitation of Persons injured by Accidents receives general acceptance in its reaffirmation of the need for the organization of such treatment, I consider that the standards of treatment and end-results will be markedly improved in Britain.

In the treatment of cases of recent traumatic wounds and of compound fractures many links in the chain of successful therapy have to be forged. None of them can be neglected. They include considerations as to first aid, shock, haemorrhage, the propriety of closure after excision of the wound, methods of preparing the limb for operation, the use or avoidance of tourniquets and antiseptics, prophylactic sera and chemotherapy, the best dressing, bandage, and retentive appliances. Furthermore, there is the great emphasis now laid upon the thorough immobilization of the limb by a method which maintains a good circulation, usually a non-padded plaster. There is the recommendation that the limb must be elevated to prevent chronic venous congestion and oedema; and the great principle also of non-interference with the wound, provided the pulse and temperature charts give no indication otherwise. A visitor to Böhler's clinic who stays to study is favourably impressed by many things, including the standardization of routine methods, and by the very important fact to the British observer that even minor and comparatively trivial cases of traumatic wounding are admitted and not treated as out-patients. This is particularly the case in injuries of the hand. Another striking detail is that the skin suturing is done very accurately and completely. Subcutaneous catgut is avoided and the skin stitches are not removed for fifteen or twenty days. Is it not too often the case that traumatic wounds do all right until the usual sixth or seventh day, when the stitches being removed and the case allowed too much liberty, things begin to go wrong? The articles by A. Tudor Hart (*British Medical Journal*, May 27 and June 3, 1939) and by Josep Trueta, Barcelona (Lancet, June 24, 1939), well repay study by all who may be called upon to deal with civilian or war casualties.

It is true that there are many ways of reaching the goal in surgery, and individuals or groups may feel entitled to think that they have good reason to be content with the results obtained by alternative methods in cases of traumatic wounds and open fractures. There are bound to be divergences of view regarding the propriety of the early closure of traumatic wounds and as to the rival claims of aseptic and antiseptic methods. We will all admit, however, that most of our knowledge is based upon authority. The best Continental practice, supported as it is by the experiences in Spain, must inevitably carry great weight and merit the closest attention. I am confident that he who makes a study of these methods and employs them with skill, care, and good judgment will add greatly to his ability to deal with traumatic surgery. The knowledge, experiment, and experience of many masters have gone to build up this system. I refer to Paré, Lister, Halstead, Sir Robert Jones, the British, American, and French surgeons in the last war, and to Böhler. It was the acute sense of the delicacy of the tissues and their great powers of natural recovery that marked these men out from their contemporaries. To improve our standards requires activity and reform in two directions. The first is administrative—to create special units in our hospitals. The second is technical—to apply improved methods in the treatment of the cases by a system of scrupulous and patient attention to a mass of details.—I am, etc.,

Edinburgh, Aug. 21. W. A. COCHRANE.

Spinal Anaesthesia

SIR,—During the last few months many articles and letters have been written to the *Journal* on spinal anaesthesia in general and the technique of administration in particular. It is a matter of considerable surprise to me that the writers have rarely mentioned the claims of "heavy" percaine as a safe and, what is most important, an easily administered spinal anaesthetic. ("Heavy" percaine (Ciba) is a hyperbaric solution 1:200, with a specific gravity of 1024 and the addition of 6 per cent. glucose. It is put up in sterile ampoules of 3 c.cm.)

I suggest that the ideal spinal anaesthetic should be:

1. Easily administered so that the premedicated patient is disturbed as little as possible.
2. Quick in action so that the start of the operation is not unduly delayed.
3. Of prolonged action when required so that long operations can be performed without hurry.
4. Free from a marked tendency to depress the blood pressure.
5. Infrequently followed by headache and other post-anaesthetic complications.

I submit that "heavy" percaine fulfills these criteria to a greater extent than any other agent in common use. Referring to the five points laid down as ideal requirements:

1. When using this preparation no elaborate movement of the patient is either necessary or desirable. He or she is merely placed on the table in the left lateral position with knees and head approximating as nearly as possible. An injection of from a minimum dose of 1 c.cm. to a maximum dose of 3 c.cm. is made in the usual way into the spinal theca. The patient is then turned on to the back and the table lowered towards the head according to the height of anaesthesia required. Throughout, the head is supported on a single firm and well-filled pillow.
2. Full anaesthesia to the desired level is achieved in from 3 to 10 minutes, the average time being 5 minutes. After 15 minutes the patient can be moved into a full Trendelenburg position with complete safety.
3. With the possible exception of "light" percaine, "heavy" percaine has the longest action of any spinal anaesthetic. I have frequently had perfect anaesthesia of two and a quarter hours, while once, with 3 c.cm., an operation lasting two and three-quarter hours was performed with comfort both to the patient and to the surgeon.

4. Fall in blood pressure in high level anaesthesia averages about 20 mm. Hg, but to a certain extent is proportional to the height of the pre-anaesthetic systolic pressure. It may be said in general that the higher the original systolic pressure the greater the subsequent drop.

5. Post-anaesthetic headache is rarely encountered so long as the foot of the bed is well raised for eight hours after operation and the patient is not allowed to get up too soon. For instance, it is unwise after the most minor operation or the smallest dose of spinal anaesthetic (of whatever type) to allow the patient to go home the next day.

In conclusion, I would draw attention again to the simplicity of technique in administering "heavy" percaine. There seems to me something rather comic in a technique which requires a semi-conscious patient to sit on the operating table and lean like a dummy over the shoulders of a staggering nurse while the anaesthetist holds a stop watch, waiting to give the signal for him to be thrown on to his abdomen, only a second or two later to be turned over on his back, so that before the operation has started any premedication has been rendered all but useless. Perhaps we are on the eve of great events. If this be so, then any methods of anaesthesia which are simple to carry out and quick in action merit attention. The data and opinions expressed are the results of experience gained in more than 400 administrations of "heavy" percaine by my partner, Mr. G. E. P. Markley, and myself during the last three years.—I am, etc.,

Bournemouth, Aug. 22. C. E. GAUTIER-SMITH.

Xenopus Test for Pregnancy

SIR,—In your issue of July 1 (p. 38) Professor L. Hogben replies to my letter of June 17 (p. 1258), in which I drew the attention of Professor F. A. E. Crew to the claims of Drs. H. A. Shapiro and H. J. Zwarenstein as the originators of the xenopus test for pregnancy. What may have seemed uncalled-for intervention on my part was due to the fact that these authors published their paper from the department of physiology of the University of Capetown. As I am at present the acting head of this department I thought it better that I should put forward their claims than the authors themselves. I am at this disadvantage, however, that apart from the published work my information is necessarily second-hand, depending on the statements of others. It would be extremely painful for me to have to discriminate between the word of Professor Hogben and Drs. Shapiro and Zwarenstein, three men for whom I have the highest regard and whose friendship I value. Since I am the one responsible for opening this discussion I should be glad to be given the opportunity of stating the position as it appears to me, and to leave any further debate to those more intimately concerned.

(1) Professor Hogben's note to the Royal Society of South Africa in March, 1930, contained the extremely important observation that ovulation was induced in the female *Xenopus laevis* by injection of the active extracts of the anterior pituitary of the ox. From this the inference might be drawn that the anterior-pituitary-like substance in pregnancy urine would probably have the same action. If this was verified, and xenopus was found sufficiently sensitive, the reaction might be used as a practical test for pregnancy.

(2) Professor Hogben refers to pregnancy tests which, on leaving Capetown, he had entrusted to Drs. Ariel Goldberg and David Slome. I am informed by Dr. Goldberg and by Dr. Zwarenstein, who actively assisted in these experiments, that numerous tests were carried out during January and February, 1931, in the physiology department. The observations were made, however, not on ovulation in xenopus but on colour changes in the skin. They were discontinued as they were found of no value as a test for pregnancy.

(3) Drs. Zwarenstein and Shapiro at a later date published the statement that xenopus loses reproductive activity when kept in the laboratory for some time. This observation was correct for the conditions under which they were keeping these animals. If true for all conditions, xenopus would be useless as a test for pregnancy except in South Africa, where an abundant supply of fresh frogs is always available. Dr. Bellerby, in Professor Hogben's laboratory, showed that xenopus, if kept under other conditions which he determined, did not lose reproductive activity in captivity. Drs. Zwarenstein and Shapiro's observation at least served the purpose of drawing attention to the necessity of special care in keeping xenopus in captivity.

(4) Later, experiments with pregnancy urine on the ovulation of xenopus were undertaken by Dr. Bellerby in London and by Drs. Shapiro and Zwarenstein in Capetown. Drs. Shapiro and Zwarenstein had previously worked in Professor Hogben's laboratory, but they affirm that this work was quite independent. There is no doubt that their publication of the first practical test appeared about five months before Dr. Bellerby's. Owing to priority of publication, the usual course would be to call this the "Shapiro-Zwarenstein test."

These authors, regarding this as a modification of the Aschheim-Zondek test, have refrained from attaching their names to it. Following their lead, might I suggest that a little credit might be given to the humble batrachian, which seems to give an invariably correct diagnosis, by calling this the "xenopus test."—I am, etc.,

Capetown, Aug. 7. J. W. C. GUNN.

Treatment of Nocturnal Incontinence

SIR,—Nocturnal incontinence is a very troublesome complaint in boys living at home, but in the public school boy it may be positively disastrous. Other boys sleeping in the dormitory are sure to find out about the weakness, and the unfortunate sufferer will be regarded with a mixture of derision, disgust, and scorn that are likely to be shattering to his morals and may induce a permanent defect of character. Many cases cure themselves before long; others are greatly helped by various well-known methods of treatment, such as giving no fluids late in the day, waking at midnight, altering the diet and sleep habits, scolding or reassuring, or giving belladonna in full doses, or thyroid extract. Most practitioners have some private recipe of their own which sometimes succeeds. Or the boy may be circumcised, or sounded for stone, or handed over to a psychotherapist. It is not until these measures have been tried that the surgeon is likely to be called in. By this time the situation is beginning to be serious; the boy soaks his bed nearly every night, and the habit seems to be ingrained. It is for cases like this that the treatments mentioned in this letter are recommended. No claim is made for originality, but they do not appear to be widely known, and about a dozen textbooks or special articles consulted do not mention them.

It is essential as a first step to remove the boy from the school dormitory to the sanatorium or to a nursing home to set his mind at rest and to observe the case. If there is day frequency or if the intelligence is of a low order the case is going to be difficult. Examination must be made to exclude irritation from stone in the bladder, from phimosis, or from worms. If there is no day frequency, no source of irritation, and the intelligence is fair, the most promising line of treatment is to inject silver nitrate into the deep urethra to reduce the sensitiveness of the nerve endings. If the patient is very frightened a general anaesthetic can be given, but normally the urethra can be rendered quite insensitive by the prior injection of decicaine.

The treatment is undertaken when there is urine in the bladder. Two c.cm. of 0.2 per cent. decicaine is injected, though a stronger solution will do no harm. It is milked back along

the urethra and a penile clip put on to hold it in. Like all other drugs, local anaesthetics take time to act. After five minutes the injection and clamping are repeated. Five minutes later the urethra is found to be anaesthetized. A catheter is then passed until the urine flows. It is withdrawn until the flow is checked. The eye of the catheter is therefore in the prostatic urethra. The distance is noted and the bladder emptied. The surgeon then injects 2 c.cm. of a 1 per cent. solution of silver nitrate. It is quite painless at the time and afterwards. If the incontinence is relieved but not cured the injection may be repeated, and a 4 per cent. solution of silver nitrate used, after an interval of a fortnight or so.

Four cases have been treated by silver nitrate injection.

A. B., aged 11. Prolonged medical and regimenal treatment, including belladonna, without success. Has phimosis. *Treatment* (June, 1928): circumcision; injection of 1 per cent. silver nitrate into prostatic urethra. *Result:* never had a wet bed after.

C. D., aged 16. Soaks the bed practically every night at school; much less frequently at home. Much treatment without success. *Treatment* (January, 1939): 1 per cent. silver nitrate injected into deep urethra. *Result:* dry ever since (July, 1939). Morale greatly improved; first in an important race.

E. F., aged 9. Wet every night in spite of much treatment. Shy and silent. Day frequency as well as night. *Treatment* (February, 1939): 1 per cent. silver nitrate injected. *Result:* no improvement.

G. H., aged 14. Wet nearly every night at home and at school. Much treatment, including a course of psychotherapy by a well-known neurologist. No better. *Treatment* (March 2, 1939): 1 per cent. silver nitrate injected. Better for a time, then relapsed. On May 19, injection of 4 per cent. silver nitrate. *Result* (July 31, 1939); dry ever since.

It will be observed, therefore, that of four inveterate cases three have been cured up to date; in one of these a circumcision was also performed. In the other case, suffering from day frequency as well as nocturnal enuresis, the treatment was a failure.

In cases of this kind a general urological examination may reveal some definite disease, such as vesical calculus, cystitis, or a pathological condition of the prostatic urethra. If no remediable cause is found the outlook is unpromising. Any little help that can be afforded to prevent a soaked bed every night, even if it is not a cure, will be acceptable. In these circumstances the boy should wear one of the rubber-lined penile clips that are supplied for the purpose by the genito-urinary manufacturing companies. It should be applied in such a manner as to compress the urethra, but not painfully; this can be regulated by the clip. Probably the boy will be awakened once or twice during the night by a desire to pass water, and he can be taught to reapply the clamp before getting back into bed. It will be helpful if a dose of aspirin or other sedative is given for the first night or two. For boys at boarding school it is wise to have a written permission from the parent, and the boy must sleep at the sanatorium or in a room by himself.—I am, etc.,

Clifton, Aug. 21. A. RENDLE SHORT, M.D., F.R.C.S., Professor of Surgery in the University of Bristol.

Alkali Poisoning

SIR,—I have read with great interest the letter of Dr. G. Llewellyn Davies (August 19, p. 424), reporting the discovery of two cases of alkali poisoning in his practice. Several years ago I was myself impressed with the number of such cases which were being admitted to a London teaching hospital, and as a result was moved to publish an article on this subject in your *Journal* (1936, **2**, 914). The symptoms, signs, diagnosis, and treatment were all discussed in this article with the hope that it would encourage an earlier diagnosis of the condition in private practice, before the stage of semi-coma had developed, in which such cases are frequently admitted to hospital.

It was our opinion at that time that alkali poisoning does not result solely from the ingestion of unusually large amounts of alkali, but that some patients develop a relative sensitivity to it, whereby they become unable to excrete in normal manner in the urine the quantities of alkali which they ingest. The percentage of individuals who develop this sensitivity while taking alkalis is probably very small, but in view of the immense number of persons who suffer from gastric trouble and who resort to "stomach powders" on their own initiative, it seemed very probable that alkali poisoning was occurring among the general population, and was often remaining undiagnosed. The development of irritability or character change, or the complaint of mental impairment by a person with gastric symptoms who is taking alkalis, should always raise the suspicion of possible alkali poisoning. Such changes are frequently mell marked, and are an early indication of the condition. It is to be hoped that Dr. Llewellyn Davies's letter will encourage others also to keep a sharp look-out for alkali poisoning among those taking "stomach powders."—I am, etc.,

Oxford, Aug. 21. C. L. COPE, F.R.C.P.

Varicosities of Veins

SIR,—Professor Lambert Rogers (*Journal*, August 19, p. 383) draws welcome attention to the use of and need for ligature in many cases of varicose veins of the lower limb. However, he writes: it is necessary to perform the ligature above the highest tributary of the internal saphenous vein, since recurrence may take place. It cannot be denied that this does occur, but the results obtained by the much easier operation of tying the vein above the highest dilated part, and at the same time injecting sodium morrhuate distally, which we do at our clinic, gives good results without a high recurrence rate. Further, when this is done some cases require no more injections or apparently less than if the vein is tied at the saphenous opening; also recurrences are not unknown after ligature at the site above the highest tributary of the internal saphenous vein.—I am, etc.,

London Hospital, E.1, Aug. 21. W. D. PARK.

SIR,—Professor Lambert Rogers pleads for a broadening of the viewpoint of the Services towards varicocele. May I draw attention to the fact that for some years now recruits for the Regular Army have been accepted with varicocele, unless very severe, and that, since 1937, the regulations have contained no mention whatever of this condition as a cause of rejection.—I am, etc.,

August 21. C. A. DE CANDOLE, Captain R.A.M.C.

Ocular Reaction to Foreign Protein

SIR,—I read with much interest the article in your issue of August 19 (p. 396) by Mr. T. G. Wynne Parry. In his case the effects of the proteins produced marked objective signs. Is it not possible that certain cases of merely subjective ocular signs may also be due to egg proteins? I have two very definite cases in mind of migraine with severe visual disturbance. Both cases were of very long standing; the patients were very partial to eggs, and digested egg dishes with such gastric comfort that they pooh-poohed the idea that any harm could come from eating them. A strong suspicion that eggs had something to do with the recurring attacks caused me to try an egg-

free diet. The results were, to say the least, marvellous—for months there was complete freedom from symptoms. What finally and definitely fixed the blame for the attacks on eggs was that more or less severe recurrences followed ingestion of eggs in cakes or pastry or puddings, while avoidance of these completely eliminated the attacks.

Eggs are present in so many articles of diet that it is almost impossible without great care to avoid partaking of some egg-containing scone or cake or sauce all the time. It is surprising in how many forms eggs may come into our diet. In many cases I have seen with an egg-free diet great amelioration of cases of migraine, but, as there are people who will not abstain from every kind of food in which eggs may be present, I have no doubt that in these cases there was not a complete absence of eggs in the diet. I would like to have tried this diet in cases of epilepsy, but, as the attacks in these cases often take place only at long intervals, it is impossible to be certain, in the event of an attack, that the patient did not partake of eggs in some form or other. A test could be made only in an institution. In the two cases I have mentioned, where I have been able to control the diet, there has been no recurrence of the distressing attacks—in one case for three years, in the other for two years—except occasional mild ones traceable to eating some form of pastry; and an interesting point about them is that the symptoms come on suddenly, usually some time on the day following the ingestion, as if they were due to some protein set free in some late process of digestion or disintegration of the molecule. I would be very pleased to hear the experience of other medical men on the subject.—I am, etc.,

ALEXANDER MACINTYRE.

Drumandaroch, Airdrie, Aug. 20.

SIR,—I am glad that when Mr. Wynne Parry in his recent article on ocular reaction to foreign protein said "ocular manifestations of allergy are not very common" he added "it may be that many such manifestations are not at the time actually recognized as such." That attitude encourages research. Unless my own investigations in the last ten years have led me into grave error, comparable manifestations are very common indeed, though it took me a long time to recognize them. Curiously enough, they are all concerned with reactions to egg, but with this difference: it is the human egg that is the root of the trouble. Having found a tendency in women for styes to occur in relation to menstruation—generally just before rather than during—I made a systematic inquiry into a large number of cases and found that a surprisingly large number of styes and tarsal cysts occurred at a time when the patients were exceptionally interested in the destiny of the human egg, or, in other words, the problem of childbirth.

The airing of such a statement in the presence of Professor Major Greenwood brought about a characteristic reaction: he demanded the figures upon which the claim was made. I had none of statistical value to show. At his suggestion I put the same interrogatory concerning interest in birth to every alternate patient, no matter of what they were complaining, and, after interviewing 158 people of both sexes and all ages, submitted the data thus obtained to Dr. May Smith of the statistical department of the London School of Hygiene, who kindly undertook to elucidate them. She reported that whereas an exceptional interest in birth was present in 92.3 per cent. of styes and 80 per cent. of tarsal cysts, the proportion in the rest, which included almost every other kind of eye trouble, was only 23.4 per cent. That took place some years ago, and since then I have investigated hundreds of other patients, with the result that not only have I confirmed the previous findings, but have convinced myself that reactions in the eye something like those described by Mr. Wynne Parry and due to emotionally charged thoughts about reproduction are far commoner than is supposed. They have been dealt with in other publications.

I could quote examples of affections of the sclerotic, cornea, and deeper ocular tissues apparently arising in much the same way as styes, and think it will be found that the sensitivity either to bacteria or other foreign proteins is dependent upon a specific repressed emotion probably acting through the endocrine system, in which the sex or egg glands play a considerable part.—I am, etc.,

Portsmouth, Aug. 21 W. S. INMAN.

Common Types of Supersensitiveness

SIR,—Dr. A. G. Auld has written many papers on the treatment of asthma by peptone, and we are indebted to him for his note in your issue of August 19 (p. 425) referring to our paper (August 12, p. 327). We do not attach great importance to the presence of peptone in Messrs. Bencard's mixed inhalants desensitizing solutions, since excellent results were obtained in cases where pollens and ingestants were the offending substances. Moreover, in many instances the desensitizing solutions were prepared to our own formulae. Specific desensitization was employed in our cases, since in them the particuuar sensitizing substance had previously been determined by skin tests.—We are, etc.,

J. GIBSON GRAHAM.
J. D. OLAV KERR.

Glasgow, Aug 21.

Bee-sting Anaphylaxis

SIR,—It is most surprising that, by the profession at any rate, little is known about the effect of bee-stings and that the subject receives the scantiest attention even in the most comprehensive textbooks of dermatology. Apiarists, however, are aware that the most diverse symptoms occur, not only in separate individuals but in the same individual on different and unpredictable occasions.

I became an apiarist only at the beginning of this year, yet even among my small acquaintance of bee-keepers I have already come across extreme diversity of bee-sting reactions. As examples: at one end of the scale is a man who has received not less than thirty stings in less than a minute, without the slightest reaction of any kind, local or general; while at the other, I have seen, and had urgently to treat, one who within three minutes of a single sting was in a state of the most profound collapse associated with intense generalized giant urticaria. (The latter individual has experienced similar reactions on several other occasions, so that the possibility of direct intravenous inoculation may be ruled out). There would appear to be all intermediate grades. In my own case, which I have not heard paralleled, tremendous localized oedema has occurred this year on three separate occasions no less than thirty-six hours after a single sting, proceeding to multiple bleb formation and slow healing, yet, surprisingly, accompanied throughout by a sense of general well-being. The commonest reaction is probably a simple, fairly rapid, localized oedema which subsides within twenty-four hours.

Your recent correspondence on the subject is not only interesting but also topical, since the value of honey as a sugar substitute is so well recognized that in the event of a prolonged blockade it is probable the demand would increase, and with it the number of bee-keepers. English honey is the finest in the world, and there is room for thousands more beehives inasmuch as it is estimated that tons of nectar runs annually to waste.

Bee-venom, of course, has for some years been marketed in standard graduated strengths for injection in the treatment of selected cases of rheumatism. I have not, however, been able to find any record of its use for desensitizing susceptible bee-keepers, although I am certain from my own experience that a course of such treatment would be welcomed by many if there was a reasonable chance of success. Therefore it would be most interesting to hear from your readers whether such specific desensitization has been attempted, and if so, what strengths and spacings are to be recommended. "British bee-venom" is put up in ampoules of "just under 1 c.cm." in strengths from 5 to 60 (undefined) units, and appears to be the only suitable preparation for the purpose.—I am, etc.,

A. W. VAISEY.

Lichfield, Aug. 30.

Reactions in Parenteral Liver Therapy

SIR,—May I through your columns draw attention to the danger of reactions in parenteral liver therapy. They are, of course, a rarity, but should be recognized. I have seen two cases.

The first, a man of 72, is suffering from pernicious anaemia. Although he has had many liver injections, on two occasions, on receiving an injection of 2 c.cm. of pernaemon forte, in from one to two minutes he became faint and pale, broke out into a sweat, and on one occasion vomited. On both occasions there had been a lapse of about three months between injections.

The second, a more serious case, is that of a woman of 45, who has had a partial gastrectomy performed for gastric ulcer. She was moderately anaemic, with a colour index approaching normal, and debilitated with a low blood pressure and a compensated mitral lesion of the heart. There was no previous history of allergy. Ten minutes after the first injection of proethron forte I was recalled to find her with veins standing out in the neck, the lower part of which were twice their normal size, oedema of the lips and eyes, erythematous eruption over the whole body, pulse racing, gasping respiration, colicky pain in the abdomen, and retching. The attack was terminated by an injection of adrenaline and heroin. Some months later she received again a small liver injection, this time of pernaemon forte, with an exactly similar result, treated with success with adrenaline. The patient was, however, on each occasion extremely ill, and no attempt since has been made to repeat the syndrome. Injections of drugs and eschatin adrenal extract do not cause any unusual reaction.

—I am, etc.,

Bath, Aug. 25. GEORGE D. KERSLEY.

Sea-sickness

SIR,—I am obliged to your various correspondents for their letters with reference to my article on sea-sickness which was published in the *Journal* of July 22.

In reply to Dr. Redmond Roche (August 5, p. 308) I have no experience of hypnosis nor of optrex eyemasks in "sea-sickness phobia," but I will certainly try the masks in my next series of patients.

With regard to Dr. C. P. Miller's reference to suppositories (August 19, p. 425), I have tried this form of administration of drugs but have been much disappointed by the results. Absorption from the rectum is often slow and sea-sick patients much prefer a hypodermic injection with a sharp needle to the disturbance necessary for the insertion of a suppository. A hypodermic injection rarely fails to produce *prompt* results, but a suppository often does.

In reply to Dr. Miller's inquiry as to my own views on morphine in sea-sickness I would not hesitate to give a really bad case a quarter to half a grain of morphine, but I do not advocate morphine for routine use in sea-sickness. The drug produces dryness of the throat, increases the bad taste in the mouth, and once the effect of a dose has worn off it has seemed, in my experience, to actually increase the nausea. Bellingham Smith and Feiling, from whose excellent book I have quoted in my article (*Modern Medical Treatment*, 1931, **2**, 119), say:

"In those grave cases, fortunately uncommon, in which the vomiting is very persistent and is followed by great prostration and collapse, we should not hesitate to resort to the use of morphine. A full dose should be given, enough to produce sleep, and it is better to combine it with atropine. Not less than 1/4 grain of morphine and 1/100 grain of atropine should be given and, if necessary, the amount of morphine may be increased to 1/2 grain."

My views with regard to morphine in sea-sickness may be summed up in the words of the President of the Royal College of Physicians: "In very severe cases with prolonged vomiting, leading to exhaustion and collapse, it may be necessary to have recourse to the injection of morphia" (*Index of Treatment*, 11th edition, 1936, p. 810).—I am, etc.,

London, E.C.4, August 30. R. J. BLACKHAM.

Nervous Disorder after Injury

SIR,—In his interesting paper (*Journal*, August 19, p. 385) Dr. Jeffrey Ramsay expresses dislike for the term "compensation neurosis." May I suggest as an alternative "litigation neurosis"? This term does not carry with it the suggestion that the symptoms are due to a desire for gain, but it implies that the mental troubles have their origin in the complicated and harassing anxieties which arise from legal controversy.—I am, etc.,

Sheffield, Aug. 23. R. G. ABERCROMBIE.

SIR,—I read with interest the article by Dr. J. Ramsay. I often wondered if any method in existence would prove to the medical man when the injured person was malingering and when he really was suffering from a disorder of function of his central nervous system after an injury. I think such a method is available now. Moreover, it corresponds to the famous laws of Henry Head. But it means only that certain vasomotor disturbances will occur in specified areas of the body or in the whole vascular system. Theoretically it is well recognized, and in any textbook of surgery one would find it mentioned that a good blood supply is necessary for the healing of a fractured bone. Practically, that important subject is completely neglected by the examining medical man. In the pathology of the brain an angiospasm is recognized now as of the utmost importance. Even a cerebral haemorrhage is considered now by many to be a result of previous destruction of surrounding cerebral tissue by repeated angiospastic attacks, and I think everybody recognizes that disturbance of vascular circulation is an important item in concussion of the brain.

The method is that of Pashon's oscillometer, or a similar instrument, that allows one to measure not only the blood pressure but also the patency of the vessels. For the brain we have the method of Baillart—measuring the blood pressure in the retinal vessels. Both methods are not easy to employ and require some training, but once mastered they are as reliable as any other clinical investigation of the blood vessels, and in my opinion are invaluable as differentiating between malingering and real disturbances of mental and nervous balance.—I am, etc.,

London, E., Aug. 24. N. PINES.

Industrial Dermatitis

SIR,—The wording of the Act is "dermatitis produced by dust or liquids." Let us quote it correctly if we are to criticize.

It is agreed on the medical and legal sides that eczema and dermatitis are one and the same reaction, and I think it would be an advantage for this Act to read "eczematous dermatitis produced by dust or liquids." This would have the advantage of confining the problem under discussion to eczematous dermatitis, even though it meant the separate mention of such affections as oil acne and folliculitis, which at present are covered only by this scheduled disease. Apart from this criticism, I would urge the maintenance of this broad description of industrial dermatitis and would oppose the effort more precisely to define the affections to be covered. Indeed, such precise definition is not possible for, apart from direct irritation of the skin, there is practically nothing to which an individual may not become sensitized. There are a thousand and one different substances encountered in industry which may, under certain circumstances and in certain individuals, provoke dermatitis. The simple test in such cases, and a test which should be made in all cases of suspected industrial dermatitis, is the "patch test." If a substance is suspected of causing dermatitis in an individual, then the application of that substance to the skin—in the form of a "patch test"—will prove whether or not it is capable of producing dermatitis in that particular individual.

The Act, however, quite properly covers more than these forms of eczematous dermatitis from direct irritation or from sensitization. All forms of eczematous dermatitis, including constitutional and seborrhoeic forms, may be produced or provoked by occupational dust or liquids. The miner working in a hot, dusty, or wet stall is an example of this, and such cases are surely entitled to compensation. The factor of constitution and predisposition and of long-continued exposure can, I think, be dealt with under other sections of the Act, but there can be no doubt that any such particular attack of trouble should be compensated.

The problem resolves itself simply into the question whether a particular workman contracting eczematous dermatitis while working under certain conditions would have suffered from similar trouble had he not been so working. That, admittedly, sometimes demands considerable dermatological knowledge and experience, but, equally, it is often a matter of simple common sense. I think a further just criticism of the Act might be that the terms "dust and liquids" may not cover all factors which may be responsible for producing outbreaks of eczematous dermatitis.—I am, etc.,

Leeds, Aug. 28. JOHN T. INGRAM.

Toxic Goitre

SIR,—Mr. Cecil A. Joll (*Journal*, August 26, p. 433) maintains that if "shock were a really potent cause of primary thyrotoxicosis one would expect that the conditions during the great war would have produced an enormous increase of the disease." There is no reason to doubt that they did. The time-lag in the increase of deaths following the great war is due to the fact that an average period of years separates incidence from death. As the death rate has been shown by Mr. Joll's chart to have increased from the year immediately following the close of the great war, an increased incidence of the disorder must have begun approximately from the earlier years of the war. Moreover, there has been a "great war" of increasing intensity, although without battles, ever since the Treaty of Versailles, and for the multitude there has been an aftermath neither of peace nor of the relative economic ease that preceded the great war.

According to J. H. Means, activating episodes such as psychic trauma are acquiring steadily greater importance—a remark to be interpreted as meaning a greater recognition of their importance. There may be general agreement in stating that psychic trauma, at the least in very many instances, effects a change which reveals the actual presence of hyperthyroidism. There seems also to be considerable agreement that, when psychic trauma "pulls the trigger" and reveals the presence of this condition, it does so, at least frequently, in persons of a special constitution. We therefore must envisage the probability that in many of those who develop primary toxic goitre there is already present an abnormal state which is merely accentuated and made more manifest by psychic trauma. Means accepts the presence of a pre-existing abnormal state. He affirms that "a psychic trauma may occasion a manic-depressive psychosis in one person, schizophrenia in another, peptic ulcer in a third, toxic goitre in a fourth, diabetes mellitus in a fifth, and no obvious effect in a sixth." It is the state or nature of the individual which determines the nature of the sequel to the trauma.

Mr. Joll also admits that the onset of symptoms may occur soon after some specific shock or fright, but finds difficulty in excluding the possibility "that the disease may have existed in an early latent or incipient form before the shock or accident, which merely aggravated or stimulated the activity of the toxic state." The suggestion that a latent or incipient form of the malady may be present before the "trigger" is pulled appears to be very near the mark in a number of cases, but the coupled statement that there are no mental or physical stigmata by which it may be characterized and might be recognized seems unlikely to survive as a law.

Just as we recognize the peak incidence of primary toxic goitre to be at a certain age period, so also we should try to become equally precise in stating the peak incidence of primary cases in relation to physical and mental types. I do not find that the incidence of primary hyperthyroidism occurs with equal frequency in those of all psychosomatic patterns. The type of individual more liable than others to primary hyperthyroidism is gracile in bone and muscle, is emotionally unstable, and has an excitable cardiovascular system, all of these features being accentuated in the revealed disease. My opinion is that manifest primary hyperthyroidism is not infrequently a culminating event in this (hyperthyroid) type of individual, when as a result of psychic trauma—for the pull on the "trigger" most often is so—a certain threshold is passed and definite excessive thyroid secretion and incretion becomes fixed, and the normal cycle of rest and activity of the gland is no longer possible. I also recognize another type of toxic goitre in young subjects, but it is a form of true secondary toxic goitre. The initial characters of this type are quite different from those shown by individuals who develop primary toxic goitre. They are neither gracile in bone and muscle nor abnormally emotional; sometimes, indeed, they are stolid; they show little or no cardiovascular instability, and they have a "simple" goitre. When such persons are seen a few years later, if, perchance, they have suffered from an intense emotional strain or a severe infection or, more commonly, from both, they may now show signs of hyperthyroidism. If these two types are lumped together one may say that toxic goitre occurs indifferently in those of any psychosomatic pattern. But there are both academic and practical reasons for this differentiation, using the terms "primary" and "secondary" in a way which seems to be correct.

It is improbable that an emotional stimulus which has sufficed to reveal the syndrome of primary toxic goitre does so by direct excitation of the thyroid gland. It is also improbable that the leakage of thyroid hormone in

toxic goitre is due to the direct action of an emotional stimulus on the thyroid by way of its nerve supply or by the direct action of adrenaline on the thyroid mechanism. But the effect of emotional stimulation is immediately evident on the cardiovascular mechanism, disturbance of which may be assumed to precede the thyroid response, and is probably caused by the increased entry of adrenaline into the circulation. The immediate clinical effect of an adequate psychic trauma is a brief exhibition of pallor, sometimes with goose-skin, followed by flushing, pulse acceleration, dynamic action of the heart, and throbbing in the vessels of the neck. The organs nearest to the cardiac force pump are the thyroid, thymus, and parathyroid glands, and it seems reasonable to assume that the intense circulatory energy let loose by sudden emotional upset or by continued strain must be greater in these structures than elsewhere in the body, excepting the heart wall itself. The thyroid and thymus are both enlarged in primary toxic goitre, and the parathyroids are probably over-active, in view of the known excessive loss of calcium in the urine and also the marked softening of bone which has been described following post-mortem examination. No single factor of any other nature than that now suggested seems so likely to cause the parallel changes in these three structures.—I am, etc.,

JOHN EASON.

Edinburgh, Aug. 30.

Foreign Bodies in Bladder

SIR,—The article by Mr. A. H. Charles (*Journal*, July 29, p. 224) and the subsequent correspondence have prompted me to look up my records of the following three cases which may be of interest.

Case 1.—A married woman, aged 24, had a forceps delivery in September, 1931, and was admitted to the London Road Hospital, Stoke-on-Trent, in February, 1932. She complained of stress incontinence of urine, frequency and pain on micturition, and a yellowish vaginal discharge, the symptoms having begun shortly after her confinement. The urine was alkaline and contained pus and staphylococci, but treatment with hexamine, etc., caused rapid improvement. Examination revealed a moderate degree of cystocele and rectocele and marked cervicitis. I performed curettage and cautery of the cervix and an anterior and posterior colporrhaphy on March 4, 1932, following which there was much improvement in her symptoms. Two months later, however, she was readmitted with intense frequency and scalding on micturition, and the urine was again infected. *X*-ray and cystoscopic examination revealed the presence of a vesical calculus and suprapubic lithotomy was performed. The convalescence and subsequent course were satisfactory. Examination of the phosphatic calculus showed a nucleus of slippery elm about one and a half inches long, and subsequent interrogation of the patient suggested that this was probably used in an attempt to interrupt the preceding pregnancy, though accurate information was not forthcoming. This case, however, taught me a valuable lesson in the diagnosis of bladder symptoms.

Case 2.—A married woman, aged about 40, was, by a coincidence, admitted to the next bed to the above patient during May, 1932, and complained of somewhat similar symptoms but had no prolapse. *X*-ray and cystoscopic examination showed an ovoid calculus and suspicions of its nature were thereby aroused. Suprapubic lithotomy was performed and a phosphatic calculus rather larger than the preceding one was removed. There was, again, a nucleus of slippery elm two inches in length and the thickness of a pencil, and a history of self-attempted abortion, dating some two years previously, was obtained.

For the facilities to treat these two cases I am indebted to Dr. C. G. Lewis, superintendent of the hospital.

Case 3.—A boy of 15, a mill-hand, was admitted to the Blackburn Royal Infirmary on February 13, 1934, suffering from frequency and pain on micturition with dribbling incontinence at times. The symptoms had arisen three months previously and the urine had become increasingly "muddy." Cystoscopy revealed considerable cystitis and phosphatic incrustation with a V-shaped phosphatic calculus. After preliminary treatment, I removed the calculus suprapubically and drained the bladder. His symptoms rapidly disappeared. Examination of the calculus showed a nucleus of twisted hemp which, after dissolving off the phosphates, consisted of thirty-four twisted strands of hemp, eleven inches in length. The boy explained, with some pride, that he had won a bet in the cloakroom of his mill by passing this length of string up his urethra, but that, having shown that it could be done, he was unable to retrieve the protruding end and the string had been lost to sight for four months.

I am indebted to Dr. John Kyle for allowing me to treat this case.

—I am, etc.,

G. F. LANGLEY, Ch.M., F.R.C.S.,
Medical Superintendent, Borough General Hospital.

Ipswich, Aug. 20.

"Medical Testament" on Nutrition

SIR,—In your issue of August 19 (p. 425) Dr. L. J. Picton replies to Dr. N. I. Spriggs, who asked for evidence that foods grown with artificial fertilizers are inferior to those raised on natural manure. Dr. Picton quotes some convincing authorities, but may I add one more, which should carry considerable weight. Some years ago Dr. Hugh Nicol, bacteriologist of the Rothamsted Experimental Station, wrote an article on "Nutrition and Health" which perhaps at the time did not draw the attention which it merited (*Morning Post*, August 3, 1937). Among other evidence produced in that article, it was stated that some farmers who had abolished livestock on their farms found difficulty in growing disease-free crops on chalky land. The use of artificial fertilizers had led to a large increase in the yield per acre, but the question of quality had not received adequate consideration. This is much more than an agricultural question; it vitally concerns the public health, and offers a promising field to the medical research worker. I know nothing of agricultural chemistry, but am told by practical farmers that artificially raised crops are inferior to those grown on natural manures; and, without entering into elaborate chemical formulae, is it not reasonable to suppose that vitamins are as necessary in the growth of plants as of animals?—I am, etc.,

HY. BROWN.

Sheffield, Aug. 21.

The Services

PROFESSOR OF MILITARY SURGERY

Colonel J. M. Weddell, late R.A.M.C., on his retirement on retired pay, has relinquished the appointment of Professor of Military Surgery and Consulting Surgeon to the Army, and is succeeded by Colonel B. Biggar, late R.A.M.C.

HONORARY SURGEON TO THE VICEROY

Colonel D. H. Rai, *M.C.*, I.M.S., has been appointed Honorary Surgeon to the Viceroy and Governor-General of India, vice Colonel A. F. Babonau, C.I.E., O.B.E., I.M.S., vacated.

Medical Notes in Parliament

On September 3 a state of war between the United Kingdom and Germany was announced in Parliament by Mr. Chamberlain and Lord Halifax. At emergency sittings on September 1 and subsequently emergency legislation passed rapidly through both Houses and became law.

On September 1 the House of Commons passed the Rent and Mortgage Interest Restrictions Bill. Dr. Elliot explained that this continued under control houses at present under control and extends the same form of control to all houses except those which in April, 1939, had a rateable value exceeding £100 in the Metropolitan Police District, or of £75 elsewhere in England, or of £90 in Scotland. The Landlord and Tenant (War Damage) Bill and the Essential Buildings and Plant (Repair of War Damage) Bill also passed. A Bill authorizing the appointment of Regional Commissioners for Civil Defence and a Bill authorizing the creation of new Ministries in connexion with the prosecution of the war were then carried. On September 2 the Royal Assent was given to these and other emergency statutes.

Conscription

In the House of Commons on September 2 Mr. ERNEST BROWN moved to bring in the National Service (Armed Forces) Bill to render all fit male British subjects of the ages from 18 to 40 inclusive liable to be called up for service in the armed forces of the Crown during the war emergency. Leave was given to bring in the Bill, and it was read a second time. Mr. HORE-BELISHA said that young men who had obtained postponement of their service under the Military Training Act were entitled to seek postponement anew by a procedure provided in the new Bill if their age groups were summoned. The postponement under the Military Training Act fell to the ground. It was intended to call up recruits by age groups. It was not intended to call up the young men under 20 till very late. They would not be allowed to volunteer for foreign service. Calling up would be entirely by age groups, and would go up the scale from the 21's and 22's. The military age might have to be extended beyond 41.

Grants for Injuries to Civilians

Sir WALTER WOMERSLEY moved on September 2 that leave be given to bring in the Personal Injuries (Emergency Provisions) Bill, to provide for grants in respect of personal injuries or death caused by air raids or other operations of war to the civil population. Treatment for injuries would be given immediately under Ministry of Health arrangements at local hospitals or by private practitioners if the case was not sufficiently grave to go to hospital. Pensions would be awarded on Service lines in accordance with the medically certified degree of disablement. Dr. HADEN GUEST asked whether the class of case would be adequately looked after in which primary injury might be trivial but the final injury very serious. He instanced scalp wounds where finally there might be found effusion of blood below the skull causing pressure on the brain and serious nervous conditions or even sudden death. Psychological injuries might also develop which at the beginning were very small things. Sir WALTER WOMERSLEY said he had secured a committee of medical specialists on mental diseases, and they were to make a full report. He could then act on it as on other matters which might be brought forward by expert medical advisers outside the Ministry. Leave was then given to bring in the Bill, and it was read a second time.

A second reading was given to the Pensions (Navy, Army, Air Force, and Mercantile Marine) Bill, and to the National Health Insurance and Contributory Pensions (Emergency Provisions) Bill. The main object of the latter is to secure that persons under national health insurance do not suffer any loss of rights by joining the Armed Forces of the Crown or by entering upon war occupations.

On the same day Dr. Elliot introduced the National Registration Bill and the Local Government Staffs (War Service) Bill. The Royal Assent was given on September 3 to the National Service (Armed Forces) Act, the Personal Injuries (Emergency Provisions) Act, the Pensions (Navy, Army, Air Force, and Mercantile Marine) Act, and the National Health Insurance and Contributory Pensions (Emergency Provisions) Act.

Obituary

ARTHUR LAUNCELOT FLEMMING, M.B., Ch.B.

In the passing of A. L. Flemming, at the age of 70, Bristol has lost the man who did more than anyone else to make a specialism of anaesthetic administration in the West of England, and the profession has lost one of the pioneers, probably the leading pioneer, of the open method for ether. It was fitting that these advances should be made in the town where Humphry Davy discovered the anaesthetic properties of nitrous oxide gas. Flemming, unlike Davy, had the happiness of seeing his work appreciated by his colleagues and his methods brought into general use.

Arthur Launcelot Flemming was born in 1869, the son of Dr. Thomas H. Flemming, of Freshford, Somerset. He was educated at Somerset College and Hermitage House, Bath, and studied medicine at the Bristol Medical School, qualifying in 1894. He held the posts of house-physician and of resident obstetric officer at the Bristol Royal Infirmary, and, later, of resident medical officer at the Bristol Mental Hospital. His particular interest in the problems of mental disease was doubtless the result of this experience. Flemming began his life-work by accepting the post of honorary anaesthetist at the Bristol Royal Infirmary. Before long he became lecturer in anaesthetics, first at the Bristol Medical School and then in the University of Bristol, and although he kept together a small and select private practice, almost the whole of his work was devoted to anaesthetics. In later years other hospitals were glad to avail themselves of his services, for longer or shorter periods, and among the surgeons who furnished him with the bulk of his cases during the formative years were James Swain and Thomas Carwardine.

After a good deal of experimental work, Flemming adopted ether administered on a mask as his routine anaesthetic for ordinary cases; this was a great advance on the Clover inhaler and chloroform anaesthesia, which had previously held the field. He believed that it was safer to keep the patient under as lightly as possible, whereas his predecessors, spurred on by impatient surgeons, were never happy until the patient was thoroughly poisoned. Sometimes a word of admonition was necessary to persuade him to push the ether sufficiently for surgical comfort, but that his method was safe is beyond question. It was not until after he had finished his long years of hospital anaesthesia that a patient died on the table before the operation had begun. The patient was an elderly man with myocardial degeneration, and surgical treatment had been postponed again and again on account of the obvious risks. Flemming quietly remarked afterwards, "That is my first anaesthetic death." It was also the last, but I never heard him mention his record except on that one occasion.

He was president of the Anaesthetics Section of the Royal Society of Medicine for 1922–4, president of the

Section of Anaesthetics at the Mancheter meeting of the B.M.A., and represented British anaesthetics in Canada in 1923. He went with the Princess Christian Hospital to South Africa during the Boer War, and was in France from 1917 to 1918 with the 56th General Hospital; in 1914 he was at the Royal Naval Hospital, Rosyth. He was medical officer to the Royal School for the Blind in Bristol, and he served the Bristol Medico-Chirurgical Society as president, and also as editorial secretary of its journal. He had many interests besides medicine. He had been a president of the Bristol Medical Dramatic Society, and he was devoted to country pursuits, especially bird observation and photography, and fishing. I well remember taking him out to identify a bird with an unusual song on Clifton Down; it was a garden warbler, which is not common with us. He was very thrilled when a peregrine falcon nested in the Avon Gorge. For one year he was a president of the Bristol Naturalists' Society.

Flemming had no enemies and hosts of friends. Absolutely straight in his dealings, always ready to serve the interests of his colleagues or his patients rather than striving for personal ends, deeply conscientious in his professional work, he was a man to be trusted and admired. He loved the society of his fellows; he had a ready wit of the kind that amuses but never hurts anyone, and a fund of stories to relate. He leaves a widow, a daughter, and a son. His brother, Dr. C. E. S. Flemming, has been well known for many years by his work on the Council of the British Medical Association. A. R. S.

Dr. CHARLES HADFIELD (London) writes: All anaesthetists will have heard with real sorrow of the death on August 25 of that master of their craft, Arthur L. Flemming of Bristol. It has been a real advantage to the science of anaesthesia in this country that, although the chief societies concerned with it naturally have their headquarters in London, some of its most distinguished practitioners have worked in the provinces and have not allowed distance to interfere with their active participation in its advancement. Many such are still with us, but to those who have passed on in the last few years, such as McCardie of Birmingham and Fairlie of Glasgow, must now be added the name of Arthur Flemming. Until failing health restricted his activities Flemming was seldom absent from meetings of the Anaesthetic Section of the Royal Society of Medicine. It was when he was president of this Section a good many years ago that I first met him personally, and got to know him intimately as his honorary secretary. I was at once impressed by his keenness and judgment in all anaesthetic matters, whether scientific or administrative. Most of all was I impressed by the charm of his personality. In those days he travelled up from Bristol after a heavy day's work in time for a Section meeting. After it was over he and a few chosen spirits would usually assemble at my house and discuss anaesthetic affairs more freely than could be done at a public meeting. Soon it would be time for him to hurry to Paddington for his midnight train back to Bristol so as to be prepared for his work early the next morning.

Although he was never one to overvalue new methods and new agents simply because they were new, he was eager to make personal trials of them, as the result of which his considered judgment was most valuable. Concerning his skill as an administrator of anaesthetics I cannot, of course, speak from personal knowledge, but the great reputation he held with surgeons in Bristol and the West of England generally is sufficient testimonial.

In addition to his skill as an anaesthetist he was a first-rate physician, and would no doubt have made his name in this branch had his activities not been drawn to his own specialty. He was also a man of very wide interests, and I have often been impressed by the extent of his knowledge of all sorts of subjects, some of them quite outside ordinary channels of information. With all this he was modest and unassuming. Although to-day we deplore the loss of a great anaesthetist, those of us who had the privilege of his friendship mourn the passing of a really lovable colleague.

A. BETTS TAPLIN, L.R.C.P.Ed.

With the death at the age of 83 years of Dr. Alfred Betts Taplin at Wallasey, on July 12, there passed from the ranks of British psychotherapists a remarkable figure. Entering the medical profession from a position in business, Taplin obtained the Edinburgh licentiateship in 1883. He became a general practitioner in a busy area of Liverpool. Aside from the exorbitant demands of practice in a day when diseases such as small-pox and typhoid were rife in the city, and inspired by the earlier work of Braid of Manchester, Bernheim of Paris, and Liébault and the Nancy school, Taplin became increasingly interested in the therapeutic application of hypnosis. To his delighted astonishment, he gradually realized within himself remarkable powers in the application of this form of treatment. A pioneer in this specialty, Betts Taplin became widely known, and soon gained a great reputation for his skill. He was largely instrumental in founding what is now the Liverpool Psychiatric Clinic.

In the successful application of suggestion treatment in its various forms Betts Taplin could have had few equals. In a day of less elaborate psychopathologies, the exercise of his powers held for him an intense fascination and a never-failing source of delight—an influence which readily communicated itself to the mind of his patient with immediate and beneficial effect. At a time when symptomatic forms of psychotherapy are less fashionable, and the art of suggestion treatment is in danger of falling into desuetude, it is significant to recall that Taplin's results were often as permanent as they were dramatic. Indeed, for those who have never had the advantage of seeing such an exponent as "B. T." in action, or who otherwise lack wide experience in this form of treatment, it must be exceedingly difficult to estimate its field and value. It needs to be realized that in a formidable proportion of patients referred for psychological investigation, even the mildest analytic methods are impracticable if not inapplicable. For such cases Taplin had a vigorous and effective treatment; but his activities were not confined to this field. His courage and confidence were quite dauntless. Were his help solicited by a colleague in conditions which had apparently resisted all other forms of treatment—as for example in cases of intractable pain, severe asthma, frequent epileptiform convulsions—his services were rendered without hesitation or consideration of possible failure. To him, no case was hopeless, no condition impossible of amelioration. It is hardly surprising, therefore, that he frequently obtained results which were apt to be regarded as miraculous in cases where all else had failed. His published works (*Hypnotism* and *Hypnotic Suggestion and Psychotherapeutics*) are notable for the inspiration which they must inevitably impart to the novice; for detailed description of therapeutic technique they bear comparison with much that has appeared in the subsequent twenty years.

Betts Taplin was extremely open-minded, ever ready to teach and demonstrate his methods; but, like many persons of intense and sustained enthusiasms, he was apt

to be impatient of incredulity. This may have rendered him sensitive to adverse criticism, made him interpret ignorance as scepticism, prevented him from laying before his profession and his fellow medical psychologists to a sufficient degree the results of his invaluable experience. The resultant loss was mutual, but all who had the privilege of close contact with Taplin found his charm of personality to be equalled only by his inexhaustible fund of humour. This was enriched by an insight which enabled him to include himself in his shafts of wit. The result was that his spirits were more than a match for the realization of increasing blindness which he thereby prevented from darkening his outlook in his latter years. This disability had the effect, perhaps, of severing him from association with his fellow practitioners and their societies, with the result that, at the last, and as he himself might have wished, he slipped away almost without that outward show of public recognition that is the rightful portion of an eminent man. Taplin was a generous friend to his profession and its institutions. The memory of his gifted service, so unsparingly rendered, will remain in the hearts of friends, patients and colleagues alike.

S. B. H.

Dr. WILLIAM STAFFORD, who died on August 18 at his residence in Nottingham at the age of 81, had been in practice there for more than fifty years. A native of that town, he received his medical education in Glasgow, where he graduated M.B. in 1883 and in the same year obtained the diploma M.R.C.S. His first medical appointments were those of house-physician and house-surgeon to the Western Infirmary, Glasgow, and house-surgeon to the Glasgow Dispensary for Skin Diseases. About 1885 he went to Nottingham and began a medical partnership with the late Dr. Stewart. Thenceforward he devoted himself to various sides of social life in Nottingham as well as to his medical duties. During the war he was active on medical boards, particularly for the assessment of claims by disabled soldiers; he was also a part-time referee under the National Insurance Act. Dr. Stafford joined the British Medical Association in 1887, and was chairman for a year of the Nottingham Division; in 1924–5 he was president of the Nottingham Medico-Chirurgical Society. He took an active part in supporting the work of St. Mary's Church, being a member of the parochial church council; he was also a pioneer member of the Church of England Men's Society. He was interested in work among boys also, and helped to found the local branch of the Gordon Boys' Home; he was medical officer to the local Scouts. A keen musician and excellent 'cellist, he was a member of the Nottingham Orchestral Society in the days when Sir Henry Wood conducted the orchestra; for some years he was a judge at the Nottingham musical festivals. For several years he lectured on physiology at Nottingham University College, and until a few years ago was medical adviser on the health of the students. Dr. Stafford was an excellent linguist, speaking French, German, and Italian fluently. During the last ten years of his life his many activities had been much handicapped by ill-health. His wife died about nine years ago; he is survived by a son who is a medical coroner in London, and a daughter.

The following well-known foreign medical men have died: Dr. VAN MOSOENCK, professor at Louvain University and president of the International Stomatological Association; Dr. EDGAR ZUNZ, professor of pharmacodynamics and therapeutics at Brussels, member of the Royal Academy of Medicine of Belgium, president of the International Therapeutic University, Officer of the Legion of Honour, aged 64; and Dr. LEGRAIN of Paris, honorary physician to the Seine asylums and the leading exponent of the campaign against alcoholism in France.

EPIDEMIOLOGICAL NOTES

Infectious Diseases for the Week

In England and Wales, London and Scotland the figures for scarlet fever showed a marked drop during the week; there was little change in the Irish figures. The disease is much less prevalent than in the corresponding week last year and much below the median value for the last nine years.

Notifications of diphtheria vary slightly, and remain well below that recorded for last year and for the last nine years.

There was a sharp rise in the incidence of the enteric fevers for the week, due rather to an increase in the number of districts involved than to an increase of persons affected in particular districts. In other words, although no outbreaks have been recorded, the distribution of the disease has become widened. More than three cases were notified in the following counties: Lancaster 11 (Liverpool 6, Manchester 1, Crosby 1, Salford 2, Wigan 1); Essex 9 (Ilford 7, Frinton and Walton U.D. 1, Chelmsford M.B. 1); Chester 6 (Bebington M.B. 4, Hoylake 1, Chester R.D. 1); London 4 (Kensington 1, Stepney 1, Lewisham 1, Woolwich 1); Middlesex 4 (Edmonton 1, Southall 1, Twickenham 2); Yorks West Riding 5 (Dewsbury 2, Barnsley 1, Castleford 1, Hemsworth 1).

Although notifications of poliomyelitis rose from 25 to 34, the number of counties affected fell from 14 to 12. The increase was due to a spread of the disease in Kent, where notifications for the week rose from 4 to 12 and the administrative districts involved rose from 2 to 9. Rural areas were affected even more than urban centres. Counties reporting more than three cases were: Kent 13 (Canterbury 2, Dover 2, Gillingham 2, Chislehurst and Sidcup 1, Bridge-Blean 1, Cranbrook 1, Maidstone 1, Malling 1, Swale 2); London 6 (Camberwell 1, Kensington 2, Lambeth 1, Southwark 1, Westminster 1).

Northern Ireland Registrar-General's Annual Report for 1938

During the year births at 25,742 were 330 more than in the previous year and represent a rate of 20 per 1,000 estimated population, or an increase of 0.2. The proportion of male births to every 1,000 female births was 1,052 compared with 1,049 in 1937. The birth-rate in Northern Ireland has fallen steadily during the last thirty years, with the exception of the period covered by the last war and the years immediately following, when there were violent fluctuations. The same trend, to a more pronounced degree, has been observed in England and Wales over this period.

Deaths at 17,649 represented a rate of 13.7 per 1,000 of the estimated population, 1.4 below that for the previous year and the lowest recorded for the present century, with the exception of the years 1930 and 1934. During the last thirty years the same general downward trend was seen in the curves for England and Wales, but the death-rates for the former country were some 15 per cent. lower than for Northern Ireland. Of the total deaths, 8,736 were of males and 8,913 were of females, being equivalent to annual death-rates of 14 and 13.5 per 1,000 of the male and female populations, respectively.

Deaths of infants under 1 year of age were 1,933, or 75 per 1,000 births registered, compared with 77 in 1937. Apart from congenital debility and neonatal abnormalities the highest proportions of deaths were caused by pneumonia, diarrhoea and enteritis, measles, whooping-cough, and bronchitis. At ages 1 to 10 years the chief diseases causing death were in order: pneumonia, tuberculosis (mainly of the central nervous system), diseases of the digestive system, and violence (burns and motor accidents). Between the ages of 10 and 35 tuberculosis (chiefly of the respiratory system) caused the highest proportion of deaths. There was a slight increase in the deaths from scarlet fever and diphtheria and a large increase in deaths from measles (due almost entirely to the Belfast epidemic in the first quarter of the year). Deaths from the enteric fevers, whooping-cough, diarrhoea in children under 2 years, and influenza showed marked decreases. The death rate from influenza was 0.2 compared with 0.9 in 1937, and was highest in the fourth instead of the usual first quarter of the year

No. 34

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended August 26, 1939.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for : (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland. Median values for the last 9 years for (a) and (b).

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for : (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases ; a blank space denotes disease not notifiable or no return available.

Disease	1939					1938 (Corresponding Week)					1930-8 (Median Value Corresponding Weeks)	
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)	(a)	(b)
Cerbrospinal fever	19	1	12	1	—	13	2	7		1		
Deaths		—	—				—	2				
Diphtheria	745	60	176	29	28	963	112	137	50	18	890	113
Deaths	16	2	3	—	1	21	6	3	3	—		
Dysentery	32	6	18		1	32	9	25		1		
Deaths				—	—				—	—		
Encephalitis lethargica, acute	2	—	—		—	4	—	—	1	—		
Deaths		1					—					
Enteric (typhoid and paratyphoid) fever	62	4	6	5	1	47	8	10	11	1	57	
Deaths	1	—	—	—	—	3	1	—	—	—		
Erysipelas			51	7	2			46	2	1		
Deaths		—					—					
Infective enteritis or diarrhoea under 2 years												
Deaths	32	5	19	8	6	55	11	2	13	4		
Measles		23	29		1			38		4		
Deaths	2	—	—	1	—	4	—	1	—	—		
Ophthalmia neonatorum	85	10	20	1	—	84	6	22		—		
Deaths												
Pneumonia, influenzal*	328	22	2		3	267	15	3		2	380	34
Deaths (from influenza)	15	2	—	—	1	10	—	—	—	—		
Pneumonia, primary			115	3				70	1			
Deaths		4		6	7		8		2	7		
Polio-encephalitis, acute	2	—				5	—					
Deaths		—					—					
Poliomyelitis, acute	34	6	1		—	71	9	10	2	2		
Deaths		1					—					
Puerperal fever	7	7	8	1	1	2	2	17	2			
Deaths		—					—					
Puerperal pyrexia	176	24	15		1	126	12	20		—		
Deaths												
Relapsing fever	—	—			—	—	—			—		
Deaths												
Scarlet fever	1,170	92	170	49	74	1,224	90	291	43	56	1,452	150
Deaths	1	—	—	1	—	1	—	—	—	—		
Small-pox	—	—	—		—	—	—			—		
Deaths	—	—		—	—	—	—		—	—		
Typhus fever	—	—	—	—	—	—	—	—	—	—		
Deaths				—	—				—	—		
Whooping-cough		175	56		15			72		11		
Deaths	14	5	2	—	—	9	—	3	1	2		
Deaths (0-1 year)	262	43	65	24	17	274	38	33	29	15		
Infant mortality rate (per 1,000 live births)	42	39				46	31					
Deaths (excluding stillbirths)	3,721	735	541	145	131	3,728	640	480	175	111		
Annual death rate (per 1,000 persons living)	9.1	9.4	10.9	9.7	11.5	9.2	8.2	9.8	11.8	9.8		
Live births	6,596	1,116	846	379	211	6,721	1,240	821	362	242		
Annual rate per 1,000 persons living	16.2	14.3	17.1	25.9	18.5	16.5	15.8	16.7	24.5	21.5		
Stillbirths	240	45	42			269	38					
Rate per 1,000 total births (including stillborn)	36	33	47			38	30					

* Includes primary form for England and Wales, London (administrative County), and Northern Ireland.

Medico-Legal

THE INSANITY DEFENCE IN DIVORCE

Three Recent Cases

Apart from making insanity a ground for divorce, the Matrimonial Causes Act, 1937, has given it prominence as a defence against a divorce petition. Cruelty and desertion were grounds for a judicial separation before the Act, but the law on the extent to which they could be excused by insanity has been scanty and obscure. Now that they are grounds for divorce three recent cases have clarified the law and two of these have shown it to be greatly at variance with good sense.

The parties in Astle *v.* Astle[1] were married in April, 1927, and had hardly lived together for three weeks when the husband began a series of violent, even murderous, assaults on his wife and on others. He was certified and sent to a mental hospital. He improved and was allowed out on parole for a time, and during one of these periods he told his wife that he had decided to kill her and himself. She pretended to agree with him, and persuaded him to go back to the hospital. He was discharged in October, but she was afraid to live with him. In March, 1931, being still at liberty, he came to the house where she was living and threatened her and her family with violence. In view of her past experience she was so frightened that she sought the protection of the police. In October, 1937, he was again certified, and he was still under restraint at the time of the hearing.

Mr. Justice Henn Collins came to the conclusion on the facts that the husband, by reason of disease of the mind, did not at the time he was committing the acts of cruelty in 1927 know their nature and quality. His lordship had to decide the novel point of law whether cruelty has to be intentional in order to serve as ground for a decree of divorce. Counsel for the wife argued that under the old law the primary, if not the only, ground on which the court intervened in a case of cruelty was the protection of the injured spouse. Therefore, when the cruelty was caused by recurrent fits of insanity, with intervals during which there would be no excuse for non-cohabitation, a decree of judicial separation would be granted. Only if the insanity were such as to require permanent restraint would the decree be refused, the lunacy laws being considered sufficient protection. (No case was cited in which a decree had been refused on this ground.) The new Act did not alter the quality of the cruelty but only the available relief, and if a judicial separation could have been granted before, a divorce should be granted now.

The learned judge could not accept this argument. To begin with, he said, to do so would introduce into the divorce court a degree of legal responsibility not applied in any other court. No other court, either criminal or civil, would hold this husband answerable for his assaults, and it would be a very strong step to say that he had done something which in the divorce court was not only an offence but must alter his civil status. Intention was therefore a necessary ingredient of the matrimonial offence of cruelty, and if a spouse behaved cruelly when irresponsible through insanity, that behaviour was not a ground for divorce. The husband in the present case, however, said his lordship, had threatened his wife once when he was at liberty and when there was no reason to suppose that he was not responsible for his actions. That isolated action would probably not by itself be sufficient ground for a decree of divorce, but to the wife, with her past experience in mind, the threat had a reality and force out of all proportion to that which it would have had if the husband had not already made attempts on her life. The earlier matter must be taken into account as aggravating, not the quality of his single act of cruelty, but its consequences. For those consequences he was responsible, even though he was not responsible for the acts which gave them their gravity.

[1] *Times*, July 29, 1939.

Fortunately, insanity is not by itself an answer to a charge of cruelty. In Kellock *v.* Kellock[2] the same learned judge was satisfied that for sixteen years, until her certification in 1931, the wife committed acts which caused danger to the life, health, and limb of her husband, and that these acts were manifestations of manic-depressive insanity. He found, however, that she knew at all times what she was doing, and that what she was doing was wrong. A respondent, he said, who has a consciously wicked mind is in law responsible. The acts of this wife "proceeded from malignity," and the husband was entitled to a divorce.

No Desertion by a Certified Patient

Mr. Justice Langton, in Williams *v.* Williams,[3] was not able to come to a conclusion similar to that given in these two cases. The wife asked for a divorce on the ground of desertion. Her husband had left her in May, 1933, and in May, 1934, she obtained an order from justices in which they adjudged him to have deserted her. In June, 1934, he was certified, and he was still under certificate at the date of the trial. He had been absent from the wife for more than three years at the presentation of the petition, but it was argued on his behalf that desertion must be wilful, and that no man who is without a mind can be said to form any intention and thus be guilty of a wilful act. In the case of Drew *v.* Drew (1888) a husband who deserted his wife was found to have persisted in his desertion although, being in prison, he was physically unable to resume cohabitation with her. In Jones *v.* Newtown Guardians (1920), however, the House of Lords held that when a wife became insane her desertion ended and her husband was liable to maintain her although she had originally deserted him. Whereas Drew could have formed a change of mind and heart towards his wife, Williams could do no such thing. The learned judge therefore regretfully refused a divorce, but remarked that his regret was tempered by the prospect that within a short time the wife might have another remedy open to her—that of divorce on the ground of the husband's incurable insanity for five years.

This case came before the Court of Appeal at the end of July,[4] but their lordships upheld the trial judge. The Master of the Rolls, Sir Wilfrid Greene, pointed out that the result of his conclusion must in many cases amount to grievous hardship. If the deserting spouse should become irresponsible the day before the petition is filed, there is no divorce. In his opinion the matter can only be put right by legislation. The other learned members of the court agreed, Lord Justice MacKinnon expressing a good deal of sympathy with the contrary view.

Undoubtedly here are two more instances where the law is "a hass" to be added to the growing file in the possession of those who will some day charge themselves with the amendment of "Herbert's Act." The amended Act should state quite clearly that cruelty is a ground for divorce whether the offender is mad or sane; and that supervening insanity shall not interrupt the three years' period of desertion unless the representatives of the respondent can prove that he or she would resume cohabitation if not under restraint.

[2] 1939, 3 All E.R., 972.
[3] 1939, 2 All E.R., 13.
[4] 1939, 3 All E.R., 825.

The annual report for 1937–8 of the National Institute for Research in Dairying, University of Reading, gives a brief general review of the work done, with detailed accounts of the activities of the several departments. It is pointed out that the division of the Institute into "departments" is mainly for administrative convenience and represents no rigid apportionment of research fields. Most of the investigations have entailed the collaboration of members of two or more departments, and often there has been collaboration with outside individuals and organizations. The bacteriological and the biochemical reports are of special interest to medical readers. A summary of the ninety-seven papers published during the twelve months is included.

Medical News

The offices of the Medical Research Council, which are at present largely occupied with emergency work, have been temporarily removed to the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, London, W.C.1 (Telephone: Museum 3041).

During war the offices of the Medical Women's Federation will be moved to 73, Bourne Way, Hayes, Bromley, Kent (telephone: Hurstway 1904).

The Ministry of Health announced on August 30 that there were then nearly 60,000 nursing auxiliaries in the Reserve in addition to many thousand V.A.D.s who have been released by the War Office and are joining the Reserve. More are still needed to make up "the first 100,000." Applications should be sent to the Central Emergency Committee for Nursing, Romney House, Marsham Street, London, S.W.1, or the medical officer of health of the county or county borough, or the nearest branch of the Order of St. John, the British Red Cross Society, or Women's Voluntary Services.

The full staff of the Ambulance Department of the Order of St. John and British Red Cross Society will continue to function from its headquarters at No. 12, Grosvenor Crescent, London, S.W.1.

The Secretary of the Royal Society of Medicine announced on August 30 that in the event of war the Society's House and Library would be closed for fourteen days from the date of outbreak. At the end of that time the Society's activities would be resumed on as nearly normal lines as circumstances permitted.

The Tavistock Clinic for Functional Nervous Disorders has been transferred to the Orchard Wing, Westfield College, Kidderpore Avenue, Hampstead, London, N.W.3., near the junction of Finchley Road and Platt's Lane. ('Phone: Hampstead 4626.) In addition to the usual work of the clinic, private practice on a pooled basis is being carried on by a large resident staff. Appointments for both clinic and private patients will be made by the secretary at any time.

It was decided on the afternoon of September 2 to cancel the remainder of the meeting of the British Association at Dundee.

The King has appointed Dr. Ralph Roylance Scott, C.M.G., M.C., to be an Official Member, and Dr. Sultan Bakhsh Malik to be an Unofficial Member of the Executive Council of the Tanganyika Territory. Dr. Malik has also been appointed an Unofficial Member of the Legislative Council of the Tanganyika Territory.

The sixth biennial Congress of the International Hospital Association, announced in the *Journal* of August 19 (p. 410) to be held at Toronto from September 19 to 23, has been postponed indefinitely.

The Regional Commissioner for Scotland announced on September 4 that the Department of Health for Scotland are engaged in large extensions of hospital facilities and heavy demands are consequently being made on manufacturers of surgical instruments and similar appliances. The Regional Commissioner stated that it would be of great public service if private institutions and nursing homes, medical men and firms possessing stocks, large or small, of the following appliances surplus to immediate needs would communicate with the Secretary, Department of Health for Scotland, 121A, Princes Street, Edinburgh: artery forceps and other types of surgical forceps in common use, surgical clamps, towel clips, hooks, retractors, surgical knives, osteotomes, hypodermic syringes, bed-pans, catgut, irrigator stands, sterilizing packs of any type, fish kettles, *x*-ray thermometers, and any other of the more common varieties of surgical instruments and apparatus.

Caldecote Hall has been taken over by the Ministry of Health as part of the base hospital for Warwickshire.

Dr. Lévy-Valensi has been nominated professor of the history of medicine in the Paris faculty in succession to Professor Laignel-Lavastine, who has been elected professor of psychiatry.

An honorarium of $1,000 to promote research work in ophthalmology is offered through the International Association for the Prevention of Blindness, the jury to consist of the executive committee together with the president and the officers of the association. The award will be made in connexion with the sixteenth Concilium Ophthalmologicum. Papers may be presented by any responsible research worker. The subject is to be simple non-inflammatory glaucoma, and may include anything definitely relative to the question. The matter must be new and of such value, in the judgment of the jury, as to merit this recognition. Papers may be written in English, French, German, or Italian; papers written in the last two languages should be accompanied by a translation in English or French. They should be in the hands of the secretary of the International Association for the Prevention of Blindness, 66, Boulevard Saint-Michel, Paris, through whom they will reach the members of the judicial committee, not later than six months before the date of the congress.

The third specification in the series of A.R.P. British Standards Specifications has just been published. This specification (BS/ARP 3) is for electric hand-lamps (fitted with primary battery or unspillable accumulator), and was prepared at the request of the Air Raid Precautions Department of the Home Office. The specification relates to the design and construction of electric hand-lamps for general use out of doors or in buildings in which the windows, roof lights, etc., are not screened. The ordinary torch type of hand-lamp would not be suitable for use in such conditions, as no means are provided for preventing the light rays being directed upwards. The specification requires that the design of the hand-lamp shall be such that the light emitted is properly directed and screened. Copies can be obtained from the British Standards Institution, 28, Victoria Street, Westminster, S.W.1, price 3d.

The French Society of Dermatology and Syphiligraphy has recently celebrated the fiftieth anniversary of its foundation.

Sir Thomas Barlow was 94 on September 4.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

Titles of medical degrees were conferred by diploma on the following women during July:

M.B., B.CHIR.—W. F. Holman, R. M. Howitt, A. M. Lewis, M. Savory, M. J. Scott.
M.B.—Mrs. A. G. Gardham.

SOCIETY OF APOTHECARIES OF LONDON

The following candidates have passed in the subjects indicated:

SURGERY.—J. V. Braithwaite, W. D. Jenkins, E. A. Milner, T. Owen, D. B. Roberts, E. Smith, H. F. Sparling, E. Wolfendale, H. Woolwich.

MEDICINE.—E. J. S. Barthorpe, A. N. Boyle, R. M. Coplans, M. E. Davies, D. H. Dracup, R. H. Gaman, T. L. B. Iredale, J. Lieber, M. C. Mair, E. C. G. Miller, E. A. Milner, D. Prysor-Jones, G. L. L. Reynolds.

FORENSIC MEDICINE.—E. J. S. Barthorpe, A. N. Boyle, R. M. Coplans, M. E. Davies, D. H. Dracup, R. H. Gaman, T. L. B. Iredale, J. Lieber, M. C. Mair, E. C. G. Miller, E. A. Milner, D. Prysor-Jones, G. L. L. Reynolds.

MIDWIFERY.—C. Bucknall, D. W. Burnford, P. S. Clarke, G. O. C. Davies-Webb, W. Gordon, K. P. D. Griffiths, S. T. Nakib, K. W. N. Palmer, V. N. Stevenage, M. Venugopalacharii.

The diploma of the Society has been granted to A. N. Boyle, R. M. Coplans, D. H. Dracup, K. P. D. Griffiths, T. L. B. Iredale, J. Lieber, E. C. G. Miller, D. Prysor-Jones, E. Smith, V. N. Stevenage, H. Woolwich.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone, unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the *British Medical Journal* must communicate with the Secretary, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

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SECRETARY, *Medisecra Westcent, London.*

The address of the B.M.A. Scottish Office is 7, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh;* telephone 24361 Edinburgh), and of the Office of the Cumann Doctúirí na h-Éireann (I.M.A. and B.M.A.), 18, Kildare Street, Dublin (telegrams: *Bacillus, Dublin;* telephone 62550 Dublin).

QUERIES AND ANSWERS

Gowers's Solution for Red Cell Counts

Dr. A. H. SKINNER (Hong Kong) writes: Many modern text-books do not refer to this. Ch'u and Forkner in the *Journal of Laboratory and Clinical Medicine* of September, 1938, assert that it has advantages over all of its rivals that they have tested. They take their formula from Mallory and Wright (*Pathological Technique*), but the amount of acid (not specified precisely) is much more than in the old text-books. Formulae are:

	A	B	C
Sodium sulphate ..	3.8 per cent.	5.42 per cent.	5.1 per cent.
Acetic acid (strength ?)	2.2 „	3.125 „	13.5 „

Distilled water add 100.

A is the original formula, B is that given in volume ii of the latest edition of the *Extra Pharmacopoeia*, and C is the Mallory and Wright formula as quoted in Ch'u and Forkner's paper. I should be grateful to learn the views of any clinical pathologists who have tried out these and similar formulae, more especially with regard to (1) exact amount of acid used; (2) stating how long at various temperatures the acid-blood mixture may safely be allowed to stand before counting; and (3) the effect, if any, of citrate or oxalate. If the acid is really four times stronger in formula C than in the others, can anyone oblige with the references to published papers which claim to prove that the old formula is superseded? Which formula is most nearly isotonic?

Income Tax

Commencing Years of Assistantship

"M.R.C.S." qualified in January, 1937, and from April to October of that year served as a house-surgeon. From November, 1937, to October, 1938, he served as an assistant at A., and from then in a similar capacity at B. How should his liability be calculated for the year ending April 5, 1939?

*** Two facts must be remembered—(1) that a house-surgeon's earnings cannot be regarded as continuous with those of an assistant because of the dissimilarity owing to the untaxable element of free board and lodging in the former, and (2) that the "previous year's basis" applies only where there is a *complete* previous year. Consequently for 1938–9 the basis is the current year's earnings and not those of the previous year, or even those of the year commencing November, 1937.

LETTERS, NOTES, ETC.

Protecting Windows from Blast

Mr. CLAUDE WHITE, M.P.S. (New Malden, Surrey), writes: The protection of windows both at home and in business from the blast of high explosive bombs is a problem confronting many of us. This particularly applies to rooms containing delicate instruments, as in doctors' surgeries, hospitals, etc. The following scheme has many advantages. The cost is negligible; it takes little time to carry out; when completed, the windows hardly show that they have been treated, and the whole presents a tidy and attractive piece of work which can be undertaken at odd moments. Briefly the method consists in obtaining a supply of discarded *x*-ray films, stripping these of their emulsion, and attaching the resulting clean piece of celluloid to the glass window by means of celluloid varnish. The celluloid sheet is thick and robust and will not buckle and kink like the thinner variety often recommended. Furthermore, they are non-inflammable. Some films may be found to have a blue base, and these can be reserved for those windows where a slight light cut off is of no importance. The best way to clean the films is to soak them in very hot water, after which the emulsion can easily be rubbed off. Pin them up to dry, and store till needed under a weight to keep them flat. A suitable cement is made as follows: celluloid, 5 parts; acetone, 15 parts; dissolve and add copal varnish, 20 parts. Many hospitals will be glad to part with their discarded *x*-ray films for the asking.

First-aid Handbook

A well-illustrated handbook was produced towards the end of last year by Messrs. T. J. Smith and Nephew, Ltd., of Hull, and already nearly a quarter of a million copies have been distributed. Further copies of this booklet may be obtained at a cost of 8s. 4d. per 100. Also available from the same firm is a wall chart (price 6d.) showing the bones and arteries of the human body and indicating the first-aid treatment immediately necessary in cases of fracture, haemorrhage, burns, etc.

Epilepsy following Gunshot Injuries

Dr. S. W. GILLMAN, D.P.M., assistant medical officer, Warwickshire and Coventry Mental Hospital, writes: A man aged 37 was admitted to this hospital in 1901, acutely depressed, deluded, and hallucinated. Four years before he had lost his left eye in a gunshot accident. He degenerated into chronic paraphrenia, and in 1925, at the age of 61 (twenty-eight years after his accident), he had his first epileptic fit, which was followed by two to ten major seizures a month until his death in 1938. The fits were unaffected by treatment. His last years were marked by increasing dementia and blindness in the right eye. Post-mortem examination showed no findings of note except the presence of several lead shots in the outer table of the skull in the front parietal region on the left side. One lead shot was attached by pia mater and arachnoid to the base of the brain near the inner surface of the left temporal lobe with no surrounding reaction and an area of scarring and cyst formation in the left temporal lobe near, but apparently not affecting, the lateral cortex. It is a reasonable assumption that the epileptogenic area was the diseased left temporal lobe which developed following the passage of the lead shot, and the striking features are the long latent period—twenty-eight years—and the presence of a lead shot in the cranial cavity for forty years.

Corrigenda

In the article by Professor B. O. C. Pribram on the "Pre- and Post-operative Treatment of Hepato-biliary Diseases," which appeared in our issue of August 26, the following sentence (p. 444) needs correcting: "When the conditions in the abdominal cavity appear to become grave the intestines start to move almost without help." This should read: "When the conditions in the abdominal cavity appear to become *normal*. . . ."

The name of Dr. R. Robins-Browne was misspelt in the list of medical practitioners recently approved for the M.D. degree at the University of Lausanne, published on August 26 (p. 471).